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Nablus Local Industrial Estate
Initial Engineering Assessment

SUBMITTED ON

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TO THE

USAID MISSION TO THE WEST BANK AND GAZA
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BY

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1 INTRODUCTION

This report contains the engineering assessment of the site allocated for Nablus Local Industrial Estate (NLIE). The estate is located in the eastern part of Nablus City on the municipal boundaries. The location of NLIE with respect to Nablus Governorate is illustrated in Figure 1.

The area proposed for Nablus Local Industrial Estate (NLIE) is 444 donums. For the time being and according to the availability of funds, about 10 donums of built area out of these 444 donums is to be considered for the initial development phase.

It should be noted that the NLIE is located in area B, where Palestinian control is limited to civil matters only, while the security and political matters are controlled by Israelis.

1.1 Visits and Contacts

Universal Group (UG) staff members met with the following parties:

- PRIZIM Project
- PIEFZA
- Nablus Municipality
- Deir Al-Hatab Village Council
- Beit Furik Municipality
- Palestinian Telecommunication Co. (PALTEL)

UG staff members have contacted or visited the offices of these parties and had discussions with the officials in charge. The objectives of these contacts and discussions have been to get more information about the project, to get the input and perception of these parties of the project and to have UG staff members more acquainted with the project.

1.2 Site Visits

UG staff members have visited the site a number of times. They noticed the general conditions of the site. The site is located in the middle part of the eastern

Figure 1: NLIE Site Location

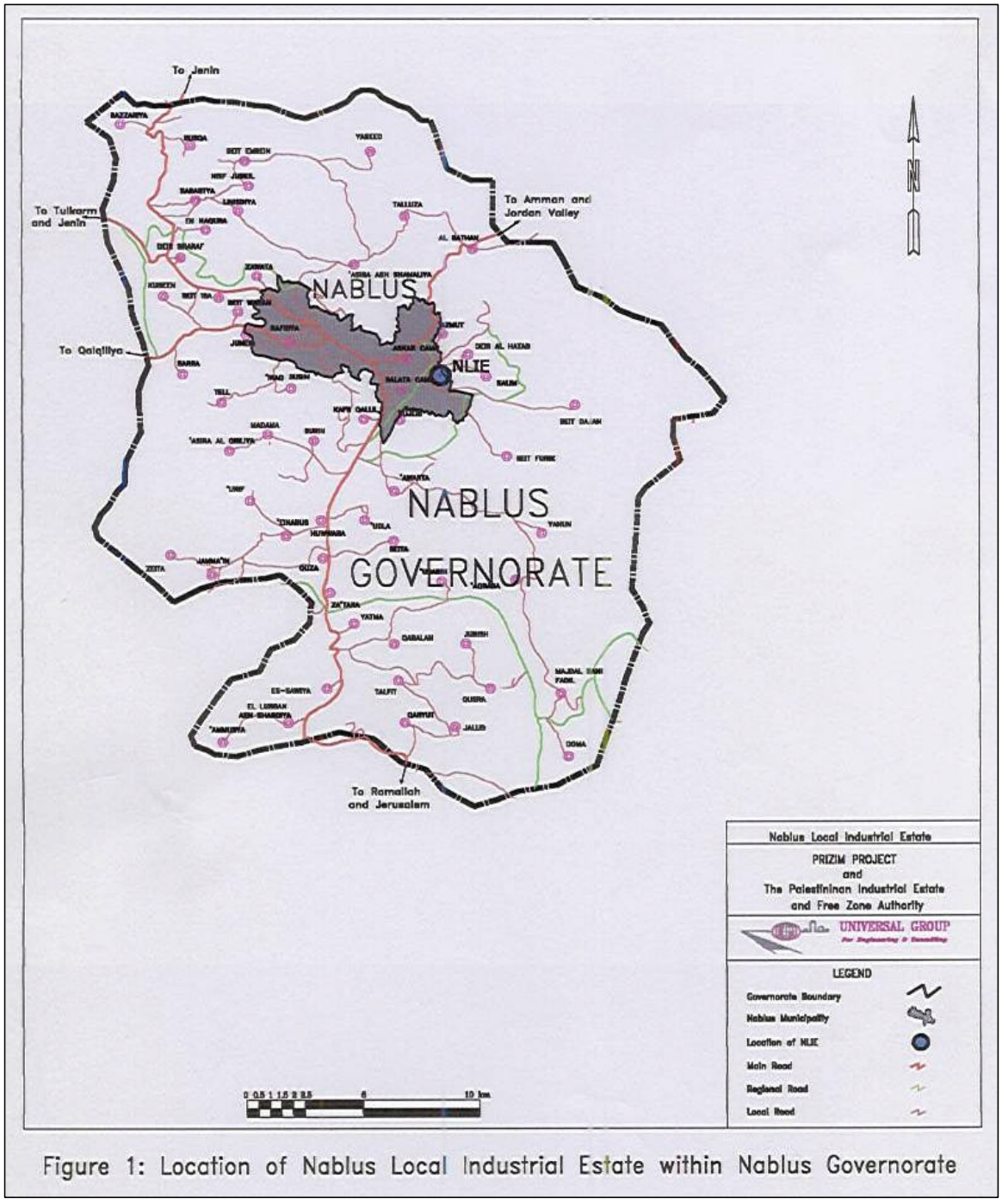

Figure 1: Location of Nablus Local Industrial Estate within Nablus Governorate

of Nablus Municipality (see Figure 2). The site is easily accessed as it is bounded by paved roads from three sides. The northern side is bounded by Deir Al-Hatab Road, the southern side is bounded by Beit Furik Road, and the western side is partially bounded by Suleiman Al-Nabulsi Bypass, as illustrated in Figure 3.

1.3 Land Ownership

Figure 4 shows a map of the site with block name, block number and the corresponding parcel numbers. Land ownership in the study area was difficult to be obtained. Table 1 gives details on a partial list of land ownership, which includes a number of parcels close or within the location of proposed initial development phase. Although most of the land is currently registered under private ownership as illustrated in the table, Nablus Municipality had already got the approval from the Planning authorities on the 444 donum project, and started a process of expropriation. According to Nablus Municipal Engineer, about 80% of the land of NLIE is now owned or in the process to be owned by Nablus Municipality.

1.4 Contacts with Local Governments and Village Councils

UG staff contacted Nablus Municipality. One of the visits to the Municipality was performed with PIEFZA Representative. However, very limited data were gathered from the municipality

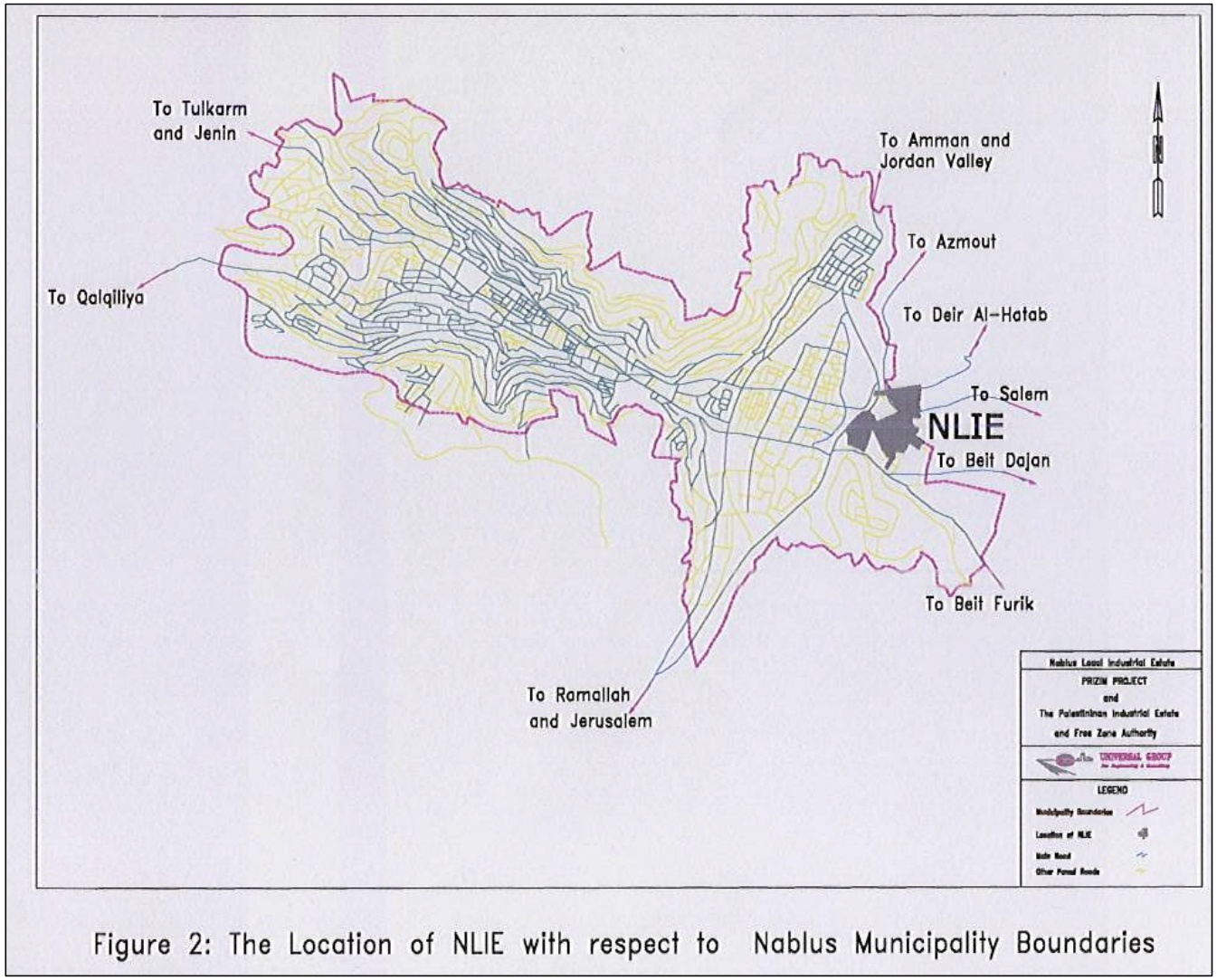

Figure 2: The Location of NLIE with respect to Nablus Municipality Boundaries

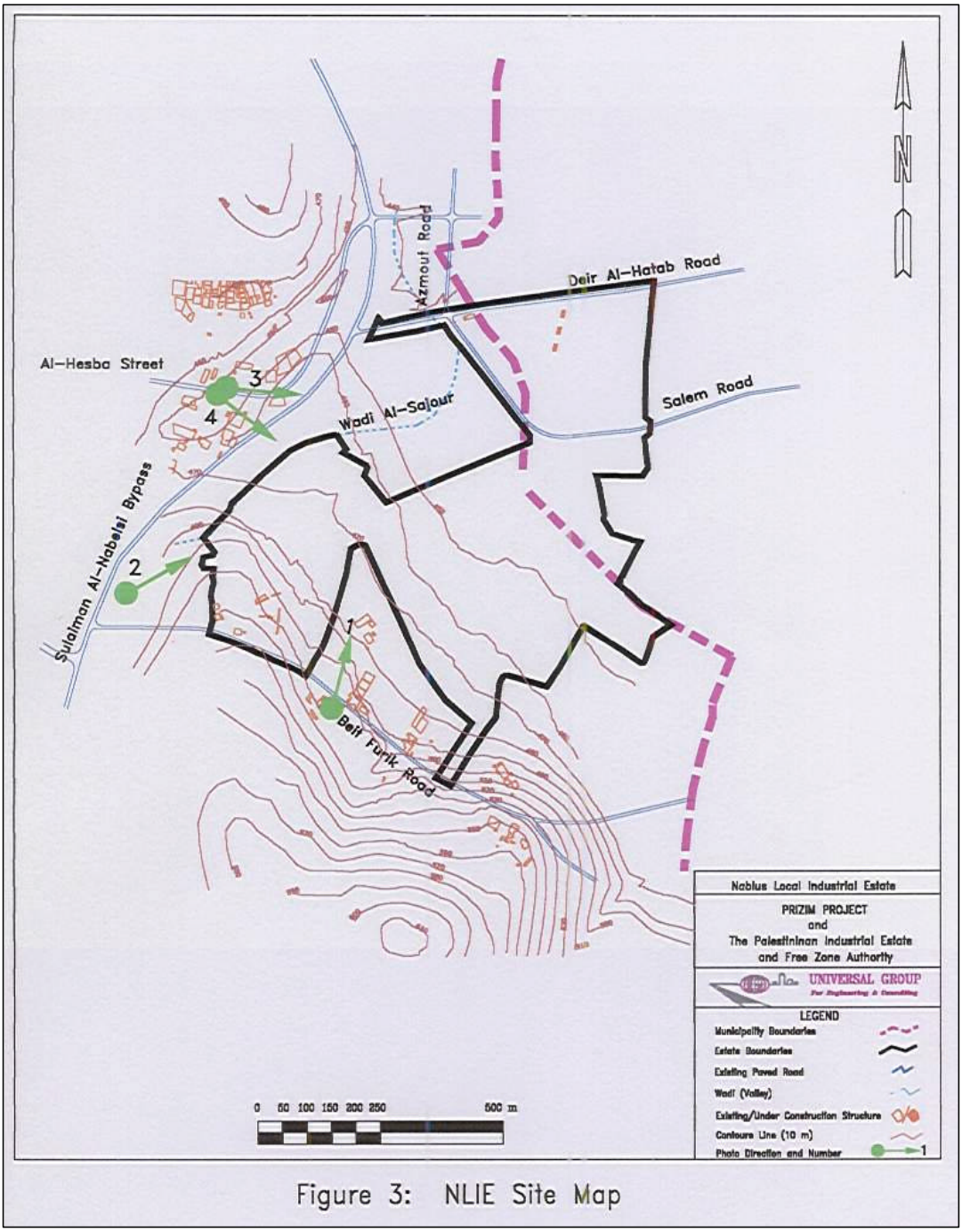

Figure 3: NLIE Site Map

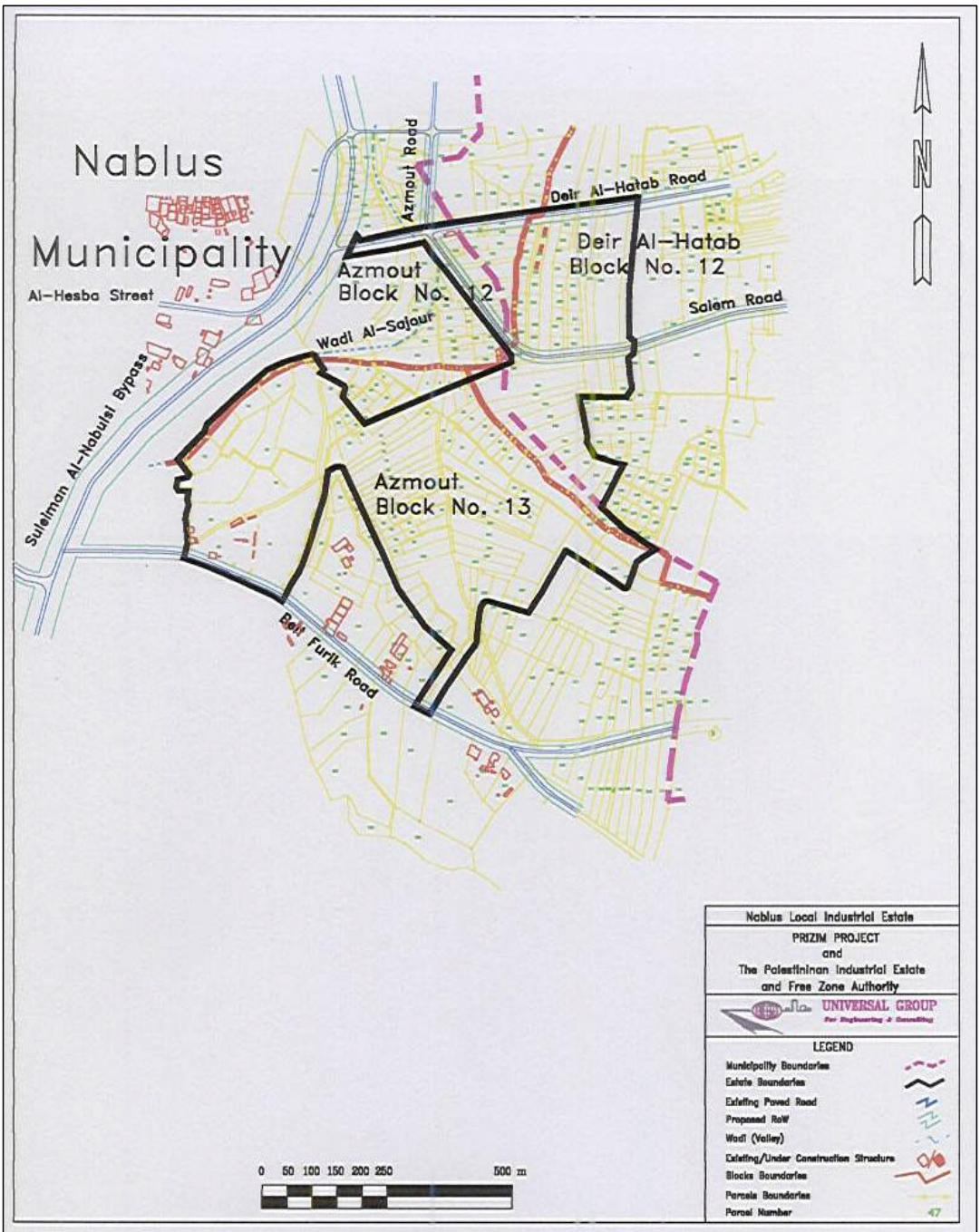

Figure 4: NLIE Site Boundaries, Blocks, and Parcels

Table (1) :Area Parcels Ownership for part of the NLIE

Block Name	Parcel	Owner	Area (m^2)
Azmout 13	1	Mefleh Hasaan and Com.	551
	2	Ibraheem Shehada and Com.	701
	3	Abed Al-Fatah Alawnehand Com.	1,804
	4	Rateb Yaseen and Com.	751
	6	Atef Al-O't ant Com.	1,929
	7	Mohammed Al-O't and Com.	1,954
	44	Mohammed Al-O't	2,956
	45	Shareef Saleh	501
	48	Adel Rasheed and Com.	701
	49	Abedallah Saleh and Com.	902
	50	Ibraheem Thabet and Com.	1,353
	51	Nablus Municipality	2,054
	52	Tha'er Afana and Com.	1,303
	53	Nablus Municipality	1,302
	54	Zakeyeh Basuoni	1,353
	55	Kamel Saleh and Com.	802
	56	Ibraheem Hasan and Com.	1,829
	57	Kamal Saleh and Com.	3,332
	58	Ragheb Saleh and Com.	2,004
	75	Tawfeek Hamed and Com.	6,613
	76	Salah Al-Akleek and Com.	701
	77	Kamal Saleh and Com.	576
	79	Hasan Rasheed and Com.	4,258
	80	Abduallah Saleh and Com.	2,480
	81	Ibraheem Saleh and Com.	1,253
	83	Salah Abu Salha and Com.	4,359

UG staff members visited or contacted representatives of the neighboring local governments and village councils and had discussions with the officials there. Which include Beit Furik Municipality, and Deir Al-Hatab Village Council.

The officials raised the issue of the necessity to have clean industries, if the site is to be developed as an industrial estate, and to make sure that no harm to environment and agriculture, and no interruption to the residential or educational patterns in the area close to NLIE will result. Moreover, some representatives indicated that if such concerns were taken into consideration, compensation against land expropriation should be fair. They indicated their concern to have this matter settled before beginning construction on site.

1.5 Contacts with PALTEL

UG staff members have made contacts with other institutions such as Palestinian Telecommunication Company (PALTEL). Relevant data on telecommunication in the surrounding areas has been discussed with the officials of PALTEL. They supplied the necessary information such as the existence, location and capacity of the lines in the surrounding area.

1.6 Discussions with PIEFZA

Several contacts and discuVVLRQVKDYHEHHQP DGHZ LWK3,( ) =$ RIILFLDOVLQFOXGLQJ Mr. I. Abu Shehada, and Mr. A. Shtayeh. Discussions cover many issues such as:

- Industry types that may be accommodated in NLIE.
- The suitable space sizes to be adopted.
- The road network and infrastructure services.

2 PROJECT DESCRIPTION

2.1 Site Description

According to the Master Plan of NLIE presented by Nablus Municipality, about 444 donums is composed of about 84 donums of light industries area, 9 donums of public facilities, 129 donums of stone cutting and quarries area, 60 donums of green areas, and 162 donums of local roads.

The proposed project area is located in Nablus district to the eastern part of the Nablus City. The area is located within coordinates ranging from178950 to 180050 North-South and from 178800 to 179800 East-West. About 70% of the NLIE is located within the boundaries of Nablus Municipality, and the remaining percentage (%30) belongs to the neighboring Deir Al-Hatab and Azmout villages. The site is located about 5.5 km from the CBD of Nablus City and about 14 km from the proposed Industrial Estate near Zatara, south of Nablus.

Photos 1-4 show the site from different directions.

2.1.1 Site Boundaries

There is no fixed landmark delimiting the site boundaries of NLIE. However, the site boundary from the north is defined by Deir Al-Hatab Access Road, from the south by Beit Furik Access Road, from the west By Suleiman Al-Nabulsi Bypass.

2.1.2 Access to the Site

NLIE can be accessed directly from Beit Furik, Deir Al-Hatab and Salem Access Roads. The southwestern corner of the site is adjacent to Beit Furik Road. In addition a separate access is provided from Beit Furik Road. Deir Al-Hatab road, which forms the northern boundary of NLIE serves the northeastern part of project site by connecting this part with Suleiman Al-Nabulsi Bypass. Salem Access Road passes through the project site from the northeastern part. Therefore, it serves the whole site. On the other hand, Suleiman Al-Nablusi Bypass serves the site as a whole. It connects the eastern part of the West Bank with the northern part and

therefore links the project area with the whole West Bank, in addition to Nablus City. Figure 5 illustrates access to the site.

2.1.3 Existing Structures on site

There is one built structure and two others under construction in the northern part of the site. In addition, there are 5 structures in the southwest corner of the site. NLIE site is mainly an agricultural area cultivated by crops. However, there are olive orchards in the northeastern part of the site.

2.1.4 Relation with Relevant Facilities and Landmarks

Figure 6 shows the site of NLIE with a number of the nearby key and relevant facilities. Table 2 gives the distance between NLIE and other facilities landmarks.

Table 2: Distance from Relevant Facilities

No.	Location	Distance (km)
1	Nablus Municipality boundary	0.00
2	Nablus Industrial Zone	1.50
3	Nablus Industrial Estate	14.00
4	Nablus Central Business District (CBD)	5.40
5	Howara Junction	4.50
6	Al-Masaken Junction	2.30
7	Private Light Industrial Estate	0.25
8	An-Najah National University/Nablus Municipality Light Industrial Estate	0.05

Photo 1: Looking North to NLIE from Beit Furik Road

Photo 2: Looking Northeast to the NLIE from a Location Close to Suleiman Al Nabulsi Bypass

Photo 3: Looking East to the NLIE from Al-Hesba Street

Photo 4: A General Overview of NLIE Site Looking Southeast from Al-Hesba Street

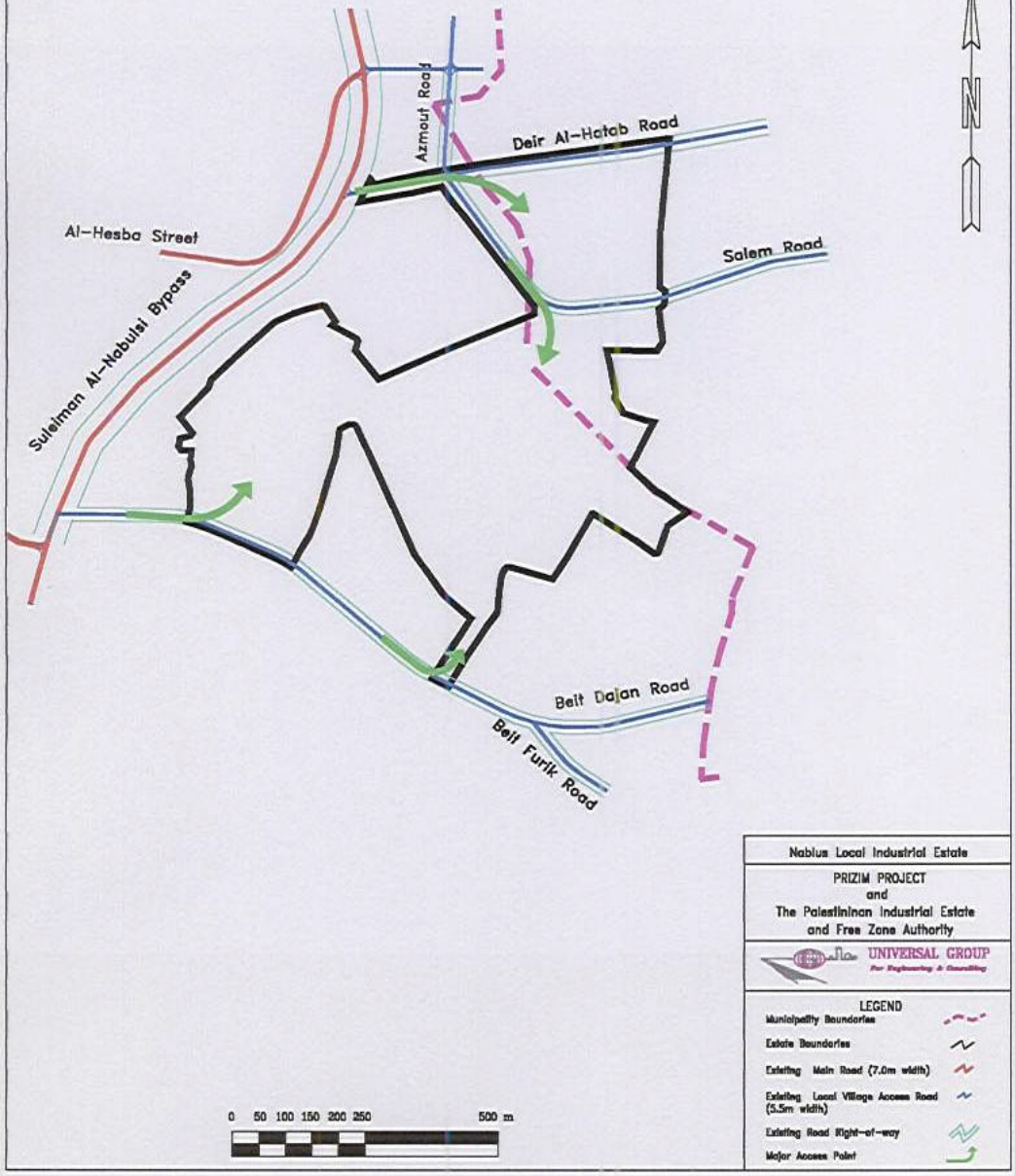

Figure 5: Road Access to the Site

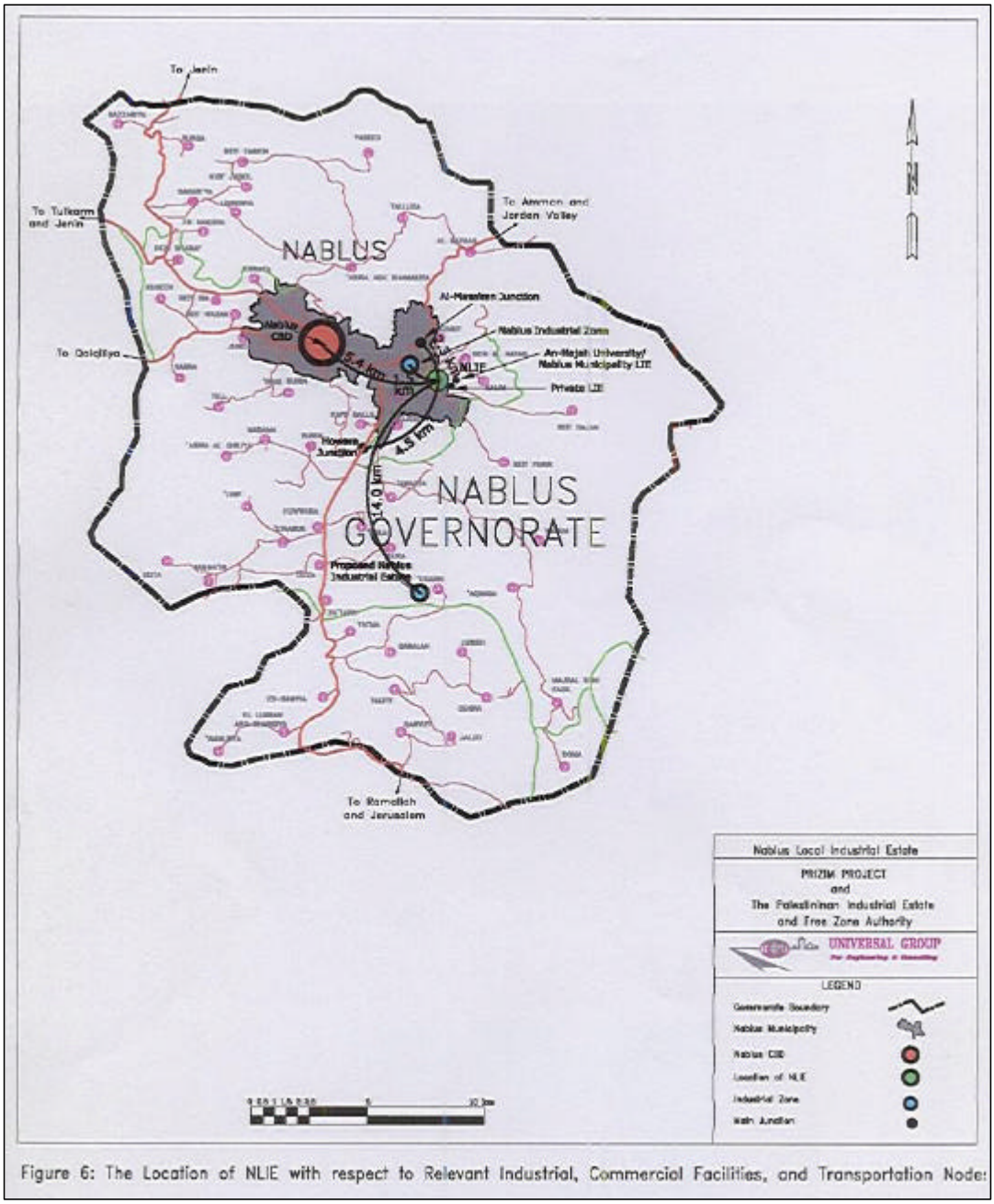

Figure 6: The Location of NLIE with respect to Relevant Industrial, Commercial Facilities, and Transportation Node:

2.2 Site Main Attributes

NLIE site is located generally in a level area (expect the hill which formed about 25% of the total area) with little obstacles for development. Its topography, soil conditions and hydrological characteristics are described below:

2.2.1 Topography

The area of the project is characterized by its gentle slopes with elevations range from 440 to 460 m above mean sea level. An elevated hill is located at the southwestern part of the area with an elevation ranging from OK above the mean sea level. The area of this hill forms about 25% of the project area. Figure 3 illustrates the topography of the site.

2.2.2 Drainage

No drainage system is available on the site, however the natural slope may facilitate the storm water drainage and collection. The topography slopes towards the north and flow in Wadi Sajour down to the Al-Fara' valley. The stormwater collected from the runoff of the NLIE can be discharged into the Wadi, which is presently, in addition to its drainage function, conveying the untreated sewage from the eastern part of Nablus City. The water is then flowing down the Sajour about 10km before it mixes the spring water of wadi Al-Badhan flowing into Al-Fara' valley.

Surface drainage is recommended to be designed for the Industrial Estate directing the rainwater to the wadi that is flowing at the western boundary of the proposed NLIE. The catchment area that corresponds to the outlet adjacent to he NLIE site is about 120ha.

As the site is relatively high and having mild but distinct slope draining directly into the wadi, which is only few hundred meters from the site, there is no chance for overflows from surroundings.

2.2.3 Soil Conditions

The rock formation of the Nablus area ranges from Cretaceous to Recent. Cretaceous rock formation is characterized by marine carbonate sediments such as limestone, dolomites, chalks and marl, frequently interspersed with chert nodules. Recent rocks are mainly wadi fill and Nari deposits.

The top soil at the NLIS is mainly determined by Terra Rossa Soil. In the Wadi near the site, the Colluvial-Alluvial soils outcrop.

The Terra Rosa soils derive from hard limestone and dolomite. Red or brownish-red in color, these soils are usually shallow clayey in texture. They have stable granular structure with lime content varying from 0-10%. The Colluvial-Alluvial soils were formed from the alluvium of mountain soils. They are generally mixed with gravel and stones and are brown in color. Theses soils are comparatively deep with texture ranging from clay to loam.

2.2.4 Hydrological Conditions

The geological formation is essential in understanding and assessing the sensitivity of the aquifers and soil strata and will affect the site selection of the NLIE. The lithological and hydrological ages of the soil cross-section of Nablus area is presented in Table 3.

There are two aquifer systems in Nablus area, the Upper Cenomanian shallow system, which consists of Hebron, Bethlehen and Jerusalem formations and the deep confined aquifer system consisting of the Upper Beit Kahil formation.

The Jerusalem and Hebron formations in the Upper Cenomamian system are of excellent aquifer and is of regional extent with relatively deeper water tables than those of the Eocene aquifer system. Most of the wells in Nablus area are exploiting this aquifer system. The Hebron formation has karst caves and joints and is of great importance as an aquifer system and should be protected.

The NLIE site is covered by the quaternary plancket covering the formations of the Bethlehem and Hebron, which are of high sensitivity. The groundwater levels at the site are deep exceeding two hundred meters. Nevertheless the disposal of

Table 3: Geological Ages

AGE	FORMATION		LITHOLOGICAL DESCRIPTION	THICKNESS (m)	HYDROLOGICAL S
	Israeli terminology	Jordanian terminology			
Eocene	Undivided	Jenin Subseries	Limestone, chalky limestone, limy chalk, chalk and marl with flint	325	Aquifer in limestone zones; aquiclude in chalk zones.
Senonian	Gharab Takia Meishash Menuha	Chalk Undivided	Chalk, chalk with flint, limy phosphatic and bitumenous, chalk, marl and shales	50-500	Aquiclude
Turonian	Bina	Jerusalem (Ktj)	Hard limestone, fine crystalline. Chalky limestone, occasionally with flints	75-100	Very good aquifer
Cenom-anian	Veradim	Beit Lehem (Kcb)	Hard dolomite, generally coarse crystalline		Very good aquifer
	Kefar Sha'ul		Dolomite, limestone, chalk and marl	40-100	Generally aquiclude
	Amminadav	Hebron (Kch)	Limestone, dolomite, dolomitic limestone; medium to coarse crystalline, karstic, porous	200-250	Excellent aquifer
	Moza marl	Yatta (Kcy)	Marl, greenish yellow	5-20	Aquiclude
	Bet Meir		Chalky limestone, chalk, limestone. Some dolomitic strata, some flint	30-80	
	Kesalon Dolomite	Upper Beit Kahil (Kcubk)	Dolomite and limestone, sometimes karstic	120-250	Good aquifer
	Soreq		Limestone and dolomite, chalky limestone and marl		Partial aquifer
	Giv'at Ye'arim	Lower Beit Kahil (Kclbk)	Dolomite, crystalline, sometimes karstic. Some limestone beds	230	Good aquifer
	Dolomite				
Albian	Kefira		Limestone and dolomite with chalky limestone and marly intercalations		Partial aquifer
	Qatana marl		Marl, limestone and sand		Aquiclude

low quality wastes might affect the wells in Badhan and Jordan valley area. The site is located in the Nablus-Jenin subsurface catchment, corresponding to the Nablus-Jenin syncline. The exploitable aquifers are the Eocene and the Upper Cenomanian aquierous formations. Natural subsurface drainage is in the direction of the Jenin region and the mountains of the north-northeast.

2.3 Existing Infrastructure and Utilities

NLIE site is furnished with most of the required infrastructure and utilities, which are available on-site or nearby. These include access roads, water supply, electricity, and telecommunication. There is no adequate wastewater collection or treatment system. The following subsections give some details for the capacity, quality and reliability of these utilities as well as the nearest connecting points to the NLIE site.

2.3.1 Access Roads

The site of NLIE is easily accessed from almost all commercial and industrial facilities in the area as described in Table 2. It is linked to Nablus City, Huwara, Al Badhan, Deir Al-Hatab, Beit Furik, Azmut, Salem, etc. In addition, the site is well-linked with the northern and southern parts of the West Bank through the nearby Suleiman Al-Nabulsi Bypass.

Figure 7 shows NLIE site and the existing road network. Table 4 gives details of existing roads in NLIE area.

Table 4: Description of the Surrounding Road Network

No	Road	Right of Way (m)	Paved Width	Surface Type	No. of lanes	Condition
1	Suleiman Al-Nabulsi Road	60	7.2	Paved	2	Moderate
2	Deir Al-Hatab Road	30	5.6	Paved	2	Very Good
3	Beit Furik Road	30	5.6	Paved	2	Moderate
4	Salem Road	25	3	Paved	1	Poor

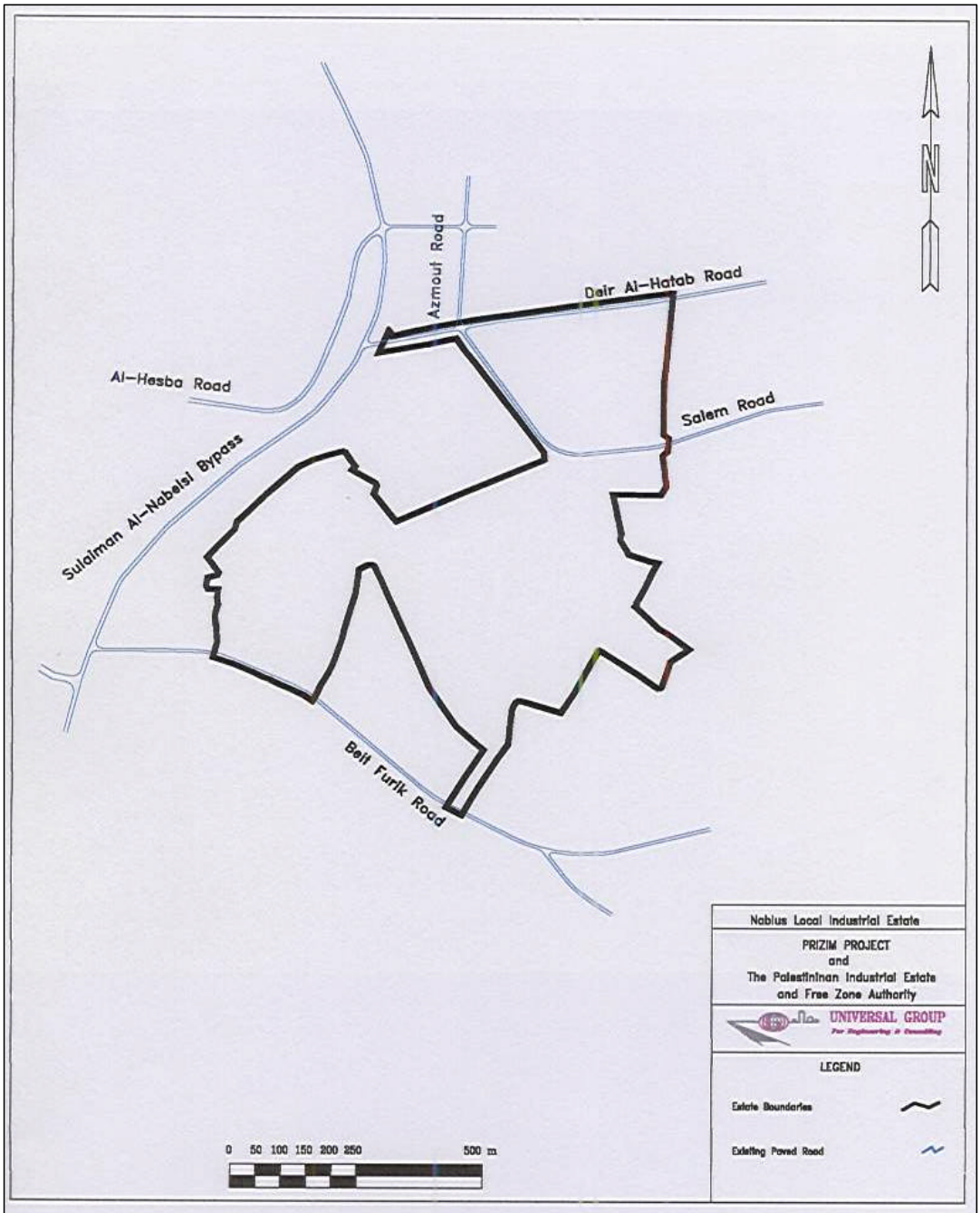

Figure 7: NLIE Site and Existing Road Network

2.3.2 Water Supply

The nearby villages to project site have water supply networks, which were constructed after 1996 specially Beit Furik and Beit Dajan villages. The networks are supplied by water mainly from the Israeli water company Mekorot. Recently, there have been studies to construct a new water well near the proposed NLIE at the tall between Beit Dajan and Beit Furik. This well, if constructed will be managed by the PWA and will support the supply of the Palestinian villages. Figure 8 illustrates the existing water networks.

The NLIE can thus be supplied from one of the following sources:

1- The 8" water main from Marda Well feeding the nearby villages (Azmout, Deir Al Hatab, Beit Furik and Beit Dajan). The well and the water mains are managed by the Israeli Water company (Mekorot).
2- The 6" water main coming from the well of Audala. This well, which was constructed in 1998 as a result of Oslo Agreement, is owned by Nablus municipality and is used for supplying parts of Nablus with drinking water. The discharge capacity of Audala well is about 350m^3/hr.
3- The proposed new well near Beit Dajan. There are no information available about this well, but if constructed it is expected to have a yield of about 200-300m^3/hr.

As the wells are tapping the relatively deep Hebron Formation, the quality of the water is high and no major treatment is required. Nablus Municipality is applying chloronation treatment occasionally to its water supply system. The karstic nature of the aquifer system increases the hardness of the water, but is still slightly below the WHO standards. Nitrates and Chlorides levels are below the WHO standards of 50 and 250mg/l, respectively.

2.3.3 Wastewater System

All the villages surrounding Nablus city including those nearby the NLIS site do not have wastewater collection systems and are using percolating pits for the disposal of their wastes. Some of the houses near the wadi dispose their wasterwater directly into it.

Nablus city has a collection system serving about 90% of the population. 35-40% of the collection system drains to the east into wadi Al-Sajour, where the untreated wasterwater flows through the wadi polluting the streambeds and cusing flies and odor nuisances. The wastewater flowing adjacent to the NLIE site at its western edge continues its path down the valley and meets the spring water in Al-Badhan.

As to the sewerage master plan of Nablus, the eastern Wasterwater Treatment Plant (WWTP) is planned in the area nearby the proposed NLIE to the north. Only 100-150 meters are separating the two proposed sites. When constructed, this treatment plant will serve the Nablus-east and the nearby villages and communities. The NLIE will benefit from this treatment plant, but restrictions may be implemented on some of the industries to treat their water locally before dumping into the treatment plant. This includes the stone cutting factories, which are planned at about 30% of the NLIE.

On the short term, a separate disposal and treatment facilities should be considered for the NLIE till the Nablus-east WWTP is constructed, otherwise the wastewater has to be directed to the wadi.

2.3.4 Solidwaste System

Nowadays, Nablus is managing its solidwaste by collecting it at a transitional station located in the eastern side of the city near the eastern wastewater outlet and the salutary house about 2km from the NLIE site. Then using relatively large containers and trucks, the waste is transported to an Israeli sanitary landfill site in the Jordan Valley. The Israeli site is charging the municipality about 40NIS per ton of wastes. This has started last year after the closure of the dumping site near Beit Dajan. Nablus Municipality has the plans to construct its own sanitary landfill site near Jiftlic area in Jordan valley. Preliminary studies has been lately awarded to an Israeli consultant to evaluate the site

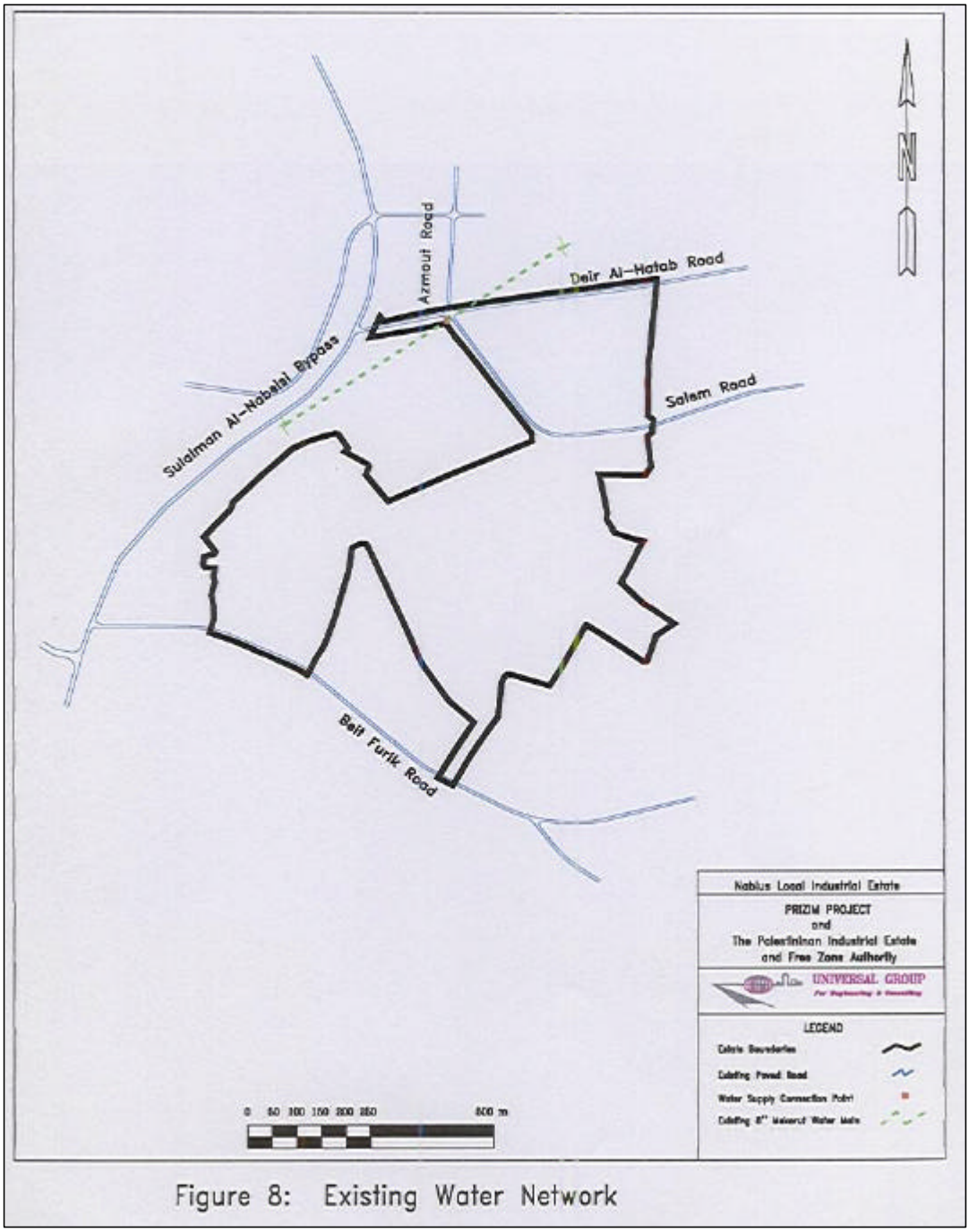

Figure 8: Existing Water Network

The Solidwaste from the NLIE has then to be managed the way the Municipality is doing now until the new proposed sanitary landfill site is constructed. This means that extra charges have to be paid by the developers of the industrial estate for managing the solidwaste disposal.

2.3.5 Electricity

Figure 9 shows the main medium voltage lines that passes near NLIE site. Two electric systems pass near the site, Nablus Municipality system and the Israeli Electric Grid System. Nablus Municipality Power lines are 33 kv medium voltage lines. Two Municipal Lines are located close to the site. One passes along the western site along Suleiman Al-Nabulsi Bypass, and the other approaches the site from the southwest corner from the eastern side. The Israeli Electric Grid Serves the villages around with a 33 kv medium voltage line. The line passes along the eastern side along Suleiman Al-Nabulsi Bypass. The line has branches passing close to the site: one bordering the southern side of NLIE serving Beit Furik and Beit Dajan with 33kv medium voltage line, and the other serving Salem and Deir Al-Hatab and passing to the north of the site through NLIE, with 33kv medium voltage.

2.3.6 Telecommunication

There are two main telephone lines in the project area. Both lines are underground. The first one v4 line passes through Al-Hesba road and reached the junction that connects Salem, Azmout, and Deir Al-Hatab. At this junction, there is a manhole with four 4-inche duct. The capacity of each duct is 2100 line. Currently, about 2000 lines are only used from the 8400 available capacity. The second cable which is a fiber optics cable passes through Beit Furik road and leads to a regional telecommunication location Center. The current capacity of this cable is 10,240 lines, but it can be expanded to 100,000 lines. Figure 14 shows the existing telecommunication lines close or near the NLIE area.

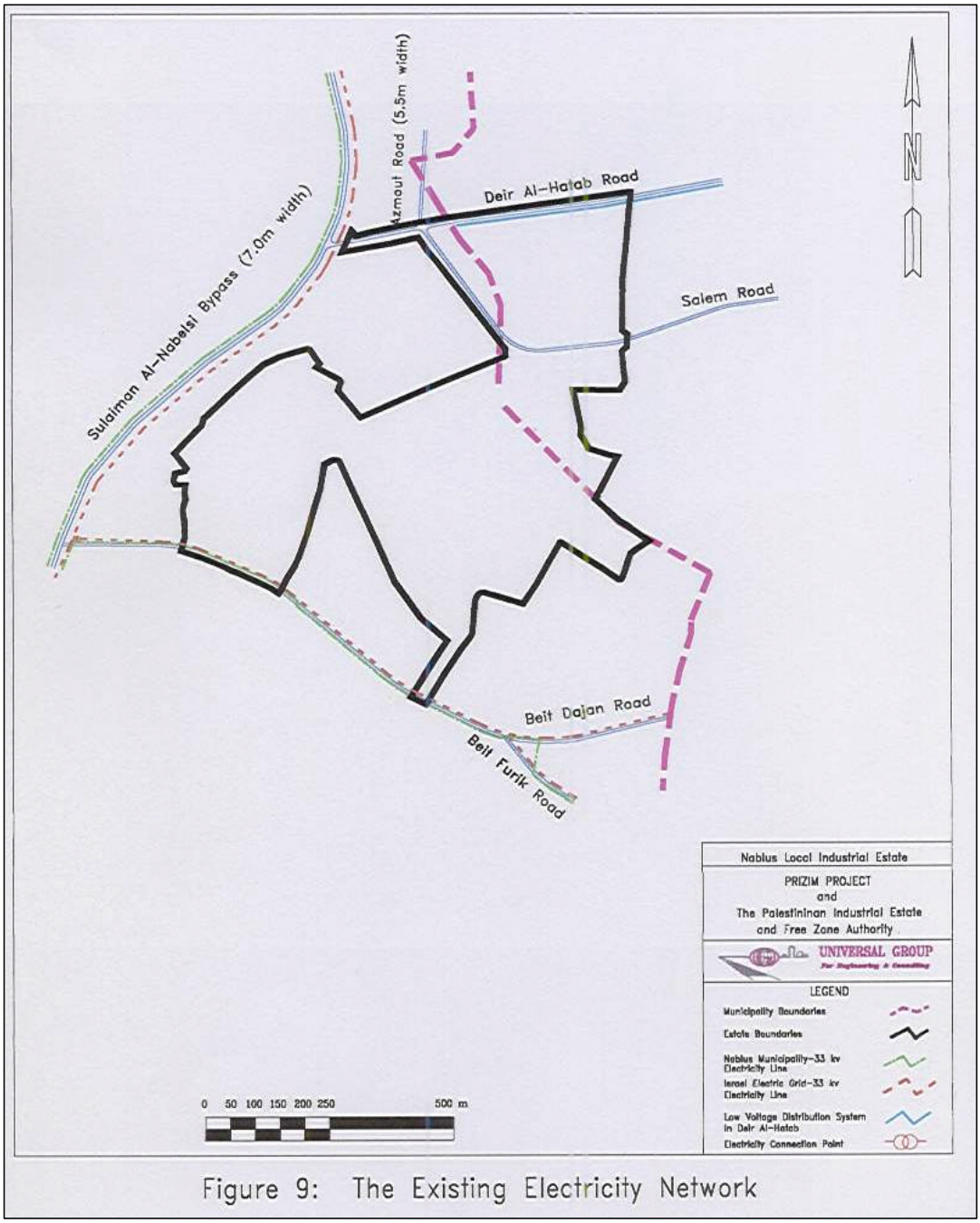

Figure 9: The Existing Electricity Network

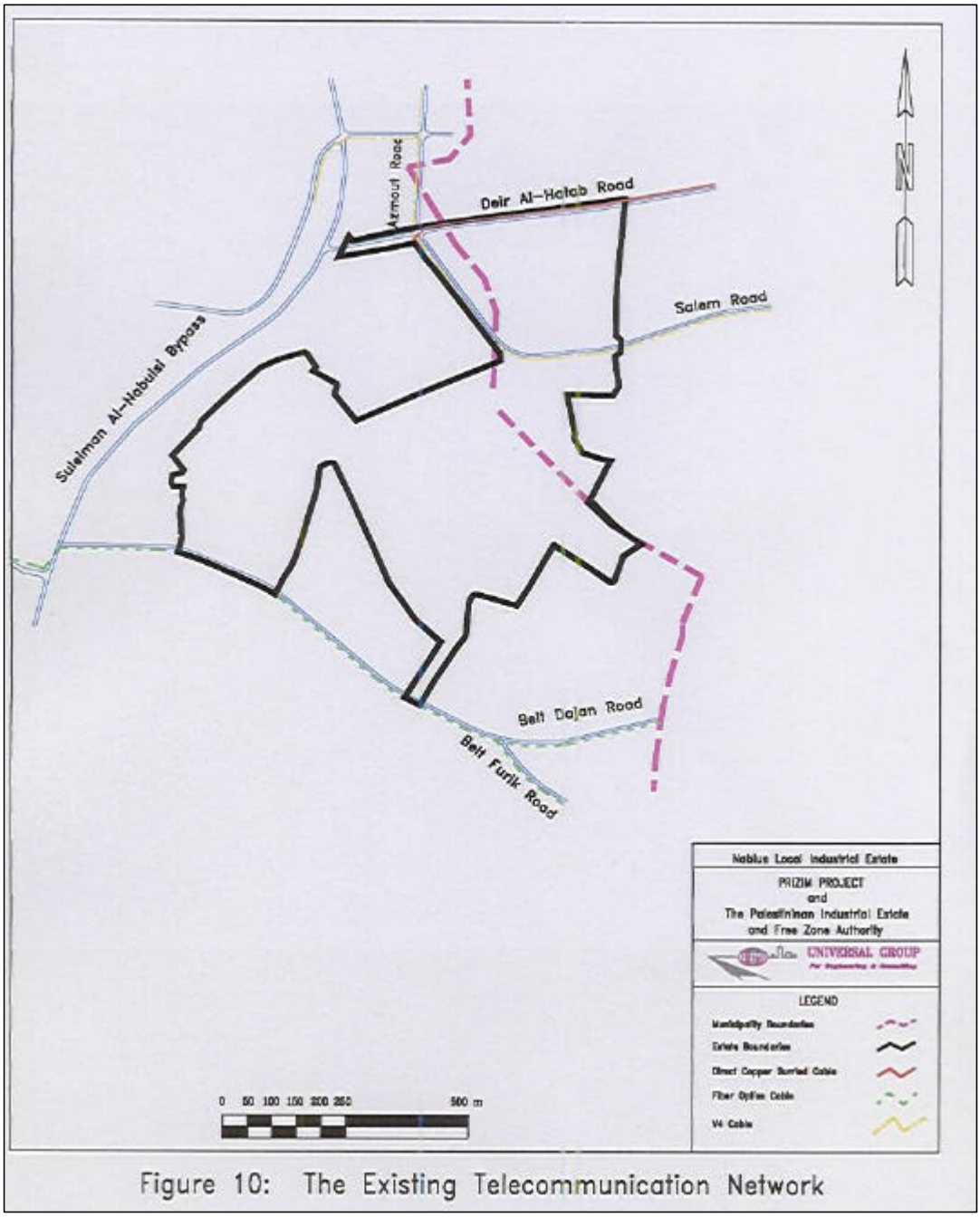

Figure 10: The Existing Telecommunication Network

3 ENVIRONMENTAL CONSIDERATIONS

To determine the environmental effect of constructing an industrial zone, the different elements of the existing environment must be analyzed. The proposed site of the NLIE is surrounded by Suleiman Al-Nabulsi road, which connect the site with Jordan Valley. This road separates the site from Nablus City bounding the site from the west. In the following paragraphs a presentation and a rough analysis of different environment factors is done to provide a base for the initial evaluation of the total effect of the NIE on the environment.

3.1 Climatic Features

The climate of Nablus district has hot, dry summers, moderate and rainy winters. In the following paragraphs the description of the different climatic parameters is presented.

3.1.1 Wind

The south and northwest winds are the prevailing winds in the area especially in winter and in the most days of autumn and summer with an annual average wind speed of 237km/day. During the year, 34% of the wind is south winds and 31% of it is the northwest wind.

The maximum average speed for the northwest wind occurs during May and October and reaches 19km/hr. for the south and southeast winds the maximum average will reach 23-29km/hr. The eastern winds occur with a prevailing percentage of 21% and with an average velocity that reaches 25km/h in November.

The Khammaseen, desert storm, may occur during the period from April to June. During the Khammasseen, the temperature increases, the humidity decreases, and the atmosphere becomes hazy with dust of desert origin.

3.1.2 Temperature

The geographic position of Nablus district in the northern part of the West Bank gives it a comparatively lower temperature range than the other districts. During

January, the coldest month, the average maximum temperature reaches 13.1^{o}C, and average minimum temperature reaches 6.2^{o}C. During August, the hottest month, the average maximum temperature is 29.4^{o}C and the average minimum temperature is 19.5 ^{o}C.

3.1.3 Humidity

The mean annual relative humidity of Nablus district is 62%. During the Khamaseen period, the relative humidity decreases to reach its minimum value of 50.72% (in May). Maximum humidity of 67% is usually registered in December, January and February. This value increases gradually at night.

3.1.4 Rainfall

Rainfall in Nablus District is limited to the winter and spring months, from October to May. The annual mean rainfall is 663.6 mm. In 1978/1979 rainfall reached only 350.3 mm while in 1991/92 rainfall reached a maximum of 1391.4 mm. Nearly 81% of the annual rainfall occurs between December and March, while July is totally dry. There is no data available on hail and snow in Nablus district and theses events are rarely happened.

3.1.5 Sunshine Radiation

The annual average solar radiation received in the Nablus district is 17.8MJ/m^{2}/day. During August, the direction receives an average of 11 hours/day of sunshine, with an average maximum solar radiation of 25MJ/m^{2}/day. In December, the district receives an average of only 5 hours/day of sunshine and an average maximum solar radiation of 9MJ/m^{2}/day.

3.1.6 Evaporation

The evaporation rate is particularly high in summer due to insulation. It can reach 237.9mm/month in July, while it reaches only 48.6mm/month in December. During the spring and autumn, the evaporation is 100-150mm/month. In December, January, February and March, precipitation exceeds the rate of evaporation.

3.2 Aquifer System

From the hydrogeological analysis presented in section 2.2.4, it can be stated that the project area lies in the Upper Cenomanian Aquifer System. The Upper Cenomanian aquifer consists of Alluvial, Hebron, Jerusalem and Bethlehem formations. These system aquifers are sensitive and need to be protected.

Figure 11 shows the geological formation and rocks outcrop of the project area. The project area is composed of Jerusalem Formation (ktj), Hebron formation (kcH), Bethlehem formation (kcb) and quaternary rocks (Qha). It can be seen that the Jerusalem formation (ktj) is the dominant and is covering most of the proposed NLIE site.

On the other hand, the large number of faults that exist in the area increases the sensitivity of the aquifer system especially when this fault separates different formations. This, again, indicates the high sensitivity of the area. The annual infiltration and recharge potential of the Jerusalem formation is estimated at 150-250mm, which is designated as high relative to the hydrological characteristics of the Palestinian aquifers.

To identify the requirements for the disposal of the wastes of the proposed industrial estate site, it is recommended to further analyze the existing aquifer system. The other criterion that should be implemented for further analysis are; soil thickness, depth to ground water tables, secondary permeability, transmissivity values, groundwater flow directions, hydraulic gradients and rainfall infiltration.

3.3 Surface Water

The NLIE site of the project lies in Al-Fara'a subsurface catchment area and drains to the Jordan valley towards the Al-Fara'a stream system up to Jordan River that flows to the Dead Sea. The wadi recharges sensitive aquifer system formation along its way to the river. For that reason preventative and teritative measures for disposing the wastewater and protecting the wadi are needed. In this regard, it is to stress that the planned wastewater treatment plant of eastern Nablus should be

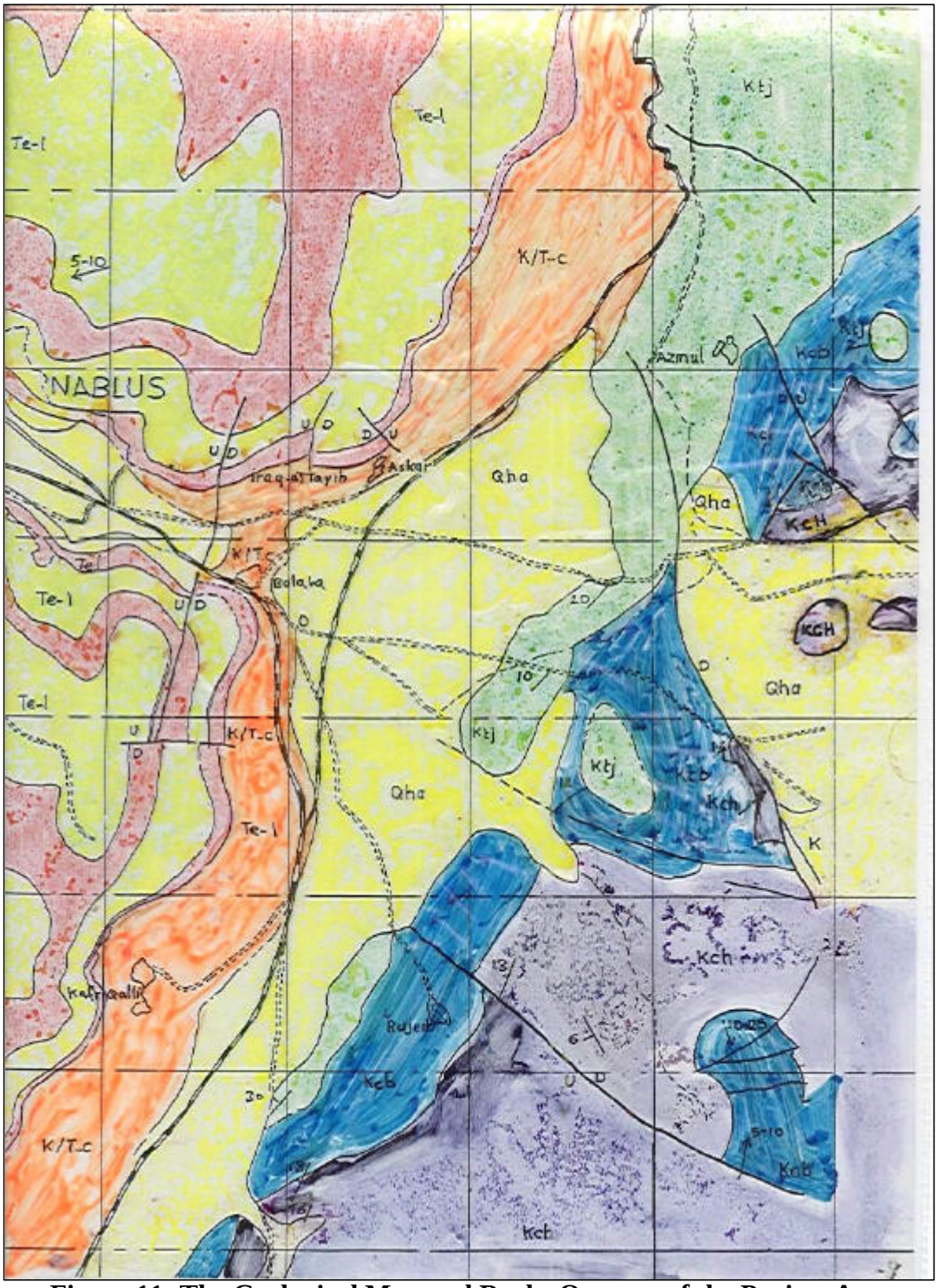

Figure 11: The Geological Map and Rocks Outcrop of the Project Area

implemented taking into consideration the development of the proposed local Industrial Estate.

On its way towards the Jordan River, Al-Fara'a stream is intercepted by the Al-Fara'a irrigation project, where the stream water is directed to flow into a piping system that is used to irrigate the farms located on both sides of the wadi in the Jordan Valley.

3.4 Air and Noise

From the analysis of the wind directions and velocities in the Nablus district, the southern and northwestern winds are the most dominant. The percentages and maximum velocities of the wind occurs during the year are presented in Figure12. Due to the continuous movement of the wind during the day, preventative measures must be taken to minimize the pollution of the air and prevent the movement of the polluted air to farther distances. This is mainly important as considerable percentage of the proposed site is to be governed by stone cutting industries.

Several human settlement are very near to the industrial site and are located zoom to the project area. These includes Azmout, Deir Al-Hatab, Salem, Rujeeb, Beit Dajan and Beit Furik. Azmout and Deir Al-Hatab villages are nearest communities located less than 500m down the street bounding the industrial estate site from the north. These communities should be protected from smell and noise by, as an example, planting a green zone including two or three raws of palm trees around the site. This will help in breaking down the noise and absorb the smell by filtering the winded air.

3.5 Land-use and Soil

Nablus district has nine distinctive major land uses. These include the Palestinian built-up areas, Israeli settlements, closed military areas and military bases, nature reserves, forests and cultivated areas.

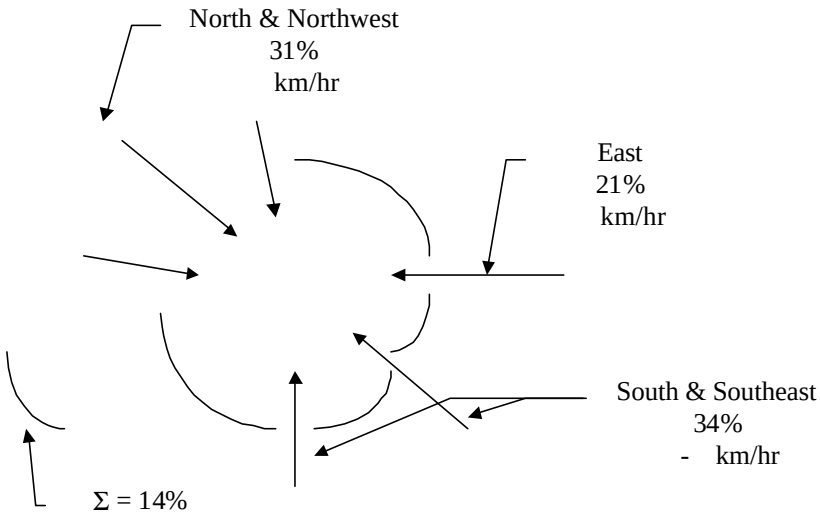

Figure 12: Prevailing Percentages and Wind Maximum Velocities in Nablus Area

The project area is located in area B as to Oslo agreement. The trucks that will transport the goods to and from the industrial site will use the Sulieman Al-Nabulsi Road connecting the area with Jordan Valley. This road is designated as C zone and is under full control of the Israeli authorities. But lately and after the construction of a new by-pass road to serve the Israeli settlements, the portion of the road near Nablus is rarely used by the Israelis and mostly to be converted into B or A zone under any further developments in the peace process.

Chemical and physical analysis must be done for the soil to help evaluating the problems and the requirements related to the possible effect of the NIE on the soil. The analysis of the soil is needed to determine the degree effect of the gases and other contaminants that might be produced by the industries on the soil characteristics.

3.6 Agriculture and Wild life

Palestine is known with its various natural plants and animals due to the variation of the geology and the climate. In the area of the project there are no wild animals as the area have been subjected to different urbanization activities and is surrounded by several villages. Significant natural plants are also not existent in the site.

The land near the site is used as agriculture land partially planted by Olive trees and partially by field crops. Due to the late urbanization activity, the cultivated land is becoming smaller. Part of the NLIE site is still planted with olive trees. The construction of the industrial zone will affect these small agricultural activities and will convert the area to an industrial zone.

The isolation of the industrial zone by means of natural or artificial boundaries will add to the protection of the surrounding natural life. Continuous observation and control must also be applied to the industrial zone to ensure their safe operation. The Environmental Impact Assessment that is recommended to be prepared as part of the plans of the NLIE should consider the above effects and the mitigation measures required.

3.7 Socio-economic Aspects

As stated above the proposed site is surrounded by several villages. The people of these villages expressed their non-acceptance of the industrial estate and oppose constructing it near their lands. There objections have been reported to the Nablus Municipality as part of the planning process of the project. The non acceptance is mainly to the stone cutting industries due to expected dust that will affect the air, the houses and the olive trees. Two schools are operating now nearby and have to be considered when planning the site. The concern of the inhabitants and the villagers should be addressed in the further planning of the NLIE.

The NLIE location will affect the social and economical characteristics of the neighboring settlements. The effect may be positive or negative. The following are some of the expected effects that should be considered:

- Provide work opportunities for the people (positive).
- Improve the living standards and income in the area through personal and governmental investments in the Estate (positive).
- Commercial and trading activities will increase (positive).
- Farmers and landowners will not give up their land easily (negative).
- Farming activities will reduce (negative).
- The remaining small agricultural activities in the area will demolish (negative).
- The direction of village development will be changed (neutral).

The above effects should be evaluated as part of the recommended Environmental and Social Impact Assessment of the project.

3.8 Traffic and Roads

The exiting Suleiman Al-Nabulsi Bypass road connecting Nablus with Jerusalem and Jordan Valley will be used to serve the proposed Industrial Estate. The existing access roads leading to the site will connect the NIE with the surrounding areas and

the possible markets and will increase the work opportunities for the surrounding villages.

The increase density of traffic will improve the trading activities of the area and will add to its economy and the economy of the surrounding Palestinian settlements.

On the other hand the traffic will affect the neighboring settlements due to the heavy traffic and associated noise and air pollution. Safety regulations and regular proofing of the traffics should be strictly implemented to reduce its effect and should be considered in the planning of the NLIE.

3.9 Summary and Conclusions

The quick analysis of the environmental elements of the site, done as part of this report is meant to give an idea of the possible impact of the construction of the Nablus Local Industrial Estate on the different elements of the existing environment.

The recommended detailed Environmental Assessment as part of the plans of the NLIE should have the purpose not to reject the construction of the Estate, but to identify the preventative and remedial measures that should be taken into consideration in order to minimize the negative effects and to benefit from the positive effects.

The following is the summary and conclusions related to the above addressed environmental elements. These must be defined in the TOR of the feasibility and environmental assessment study to be considered among others:

1. Protection for the aquifer system in the project area due to its sensitive.
2. Treatment of the wastewater of the industrial estate.
3. Disposing the wastewater and protecting of the wadi.
4. Protection for surrounding village from the of noise and air pollution.
5. Isolation of the industrial zone by natural or artificial boundaries.

6. Specify the operation specifications for each activity of the NLIE.
7. Consider the work opportunities and expected improvements of living standards of the surrounding areas.
8. Evaluation for the environmental effect of the construction of and/or widening of the road and other access roads serving the site.
9. Implementation of safety regulations and regular proofing of traffics.

4 INITIAL DEVELOPMENT PHASE

4.1 Determination of Unit Sizes

The area available for development under this project (NLIE) is 444 donums. From discussions with PIEFZA officials, it is concluded that there is preference to have the Initial Development Phase (IDP) to be compatible much as possible with the Master Plan of NLIE proposed by Nablus Municipality as presented in Figure 13.

Critical factors to be considered in the design of the size of the units, is the desire to have the basic size of the modular unit as small as possible, to satisfy needs of the industries including the small-scale industries, and to base the design on the results of the recently performed marketing study. Therefore, the size of the modular unit is considered to be 150 m^2. On the other hand, unit sizes more than 600 m^2 are not considered for the IDP. Examination of the results of the marketing study, and according to this frequency distribution of the size of unit needed by the respondents, the number and size of industrial units up to the 600 m^2 are therefore suggested to be distributed as presented in Table 5.

Table 5. The Demand Distribution for the Industrial Units for the IDP

Size category (m^2)	% of demand
0 - 150	60
151 - 300	25
301 - 600	15
Total	**100**

The marketing study indicated that for the respondents who indicated the size of the unit not to exceed 600 m^2, about 60% of them preferred size of units not

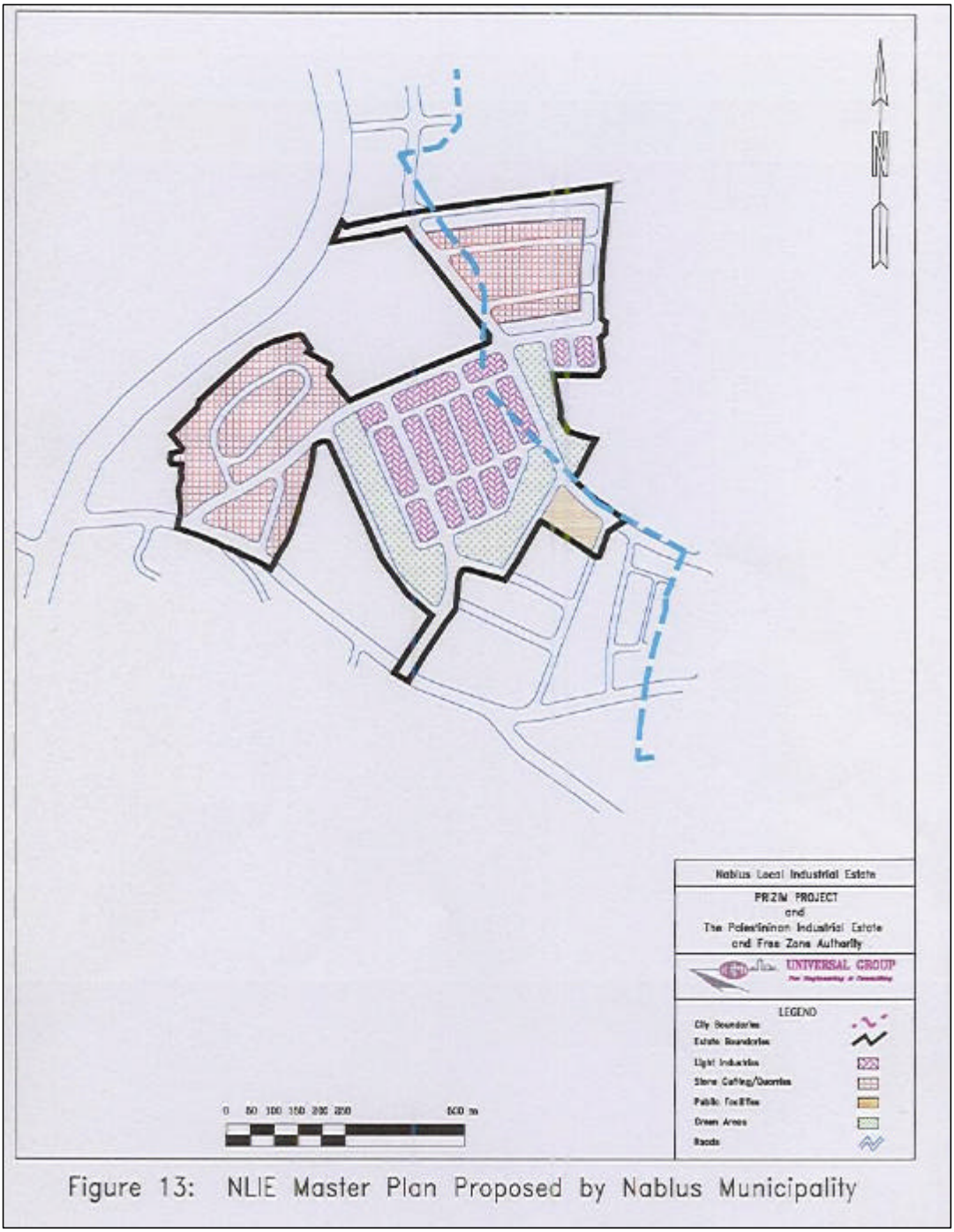

Figure 13: NLIE Master Plan Proposed by Nablus Municipality

exceeding 150 m^2. The share of the respondents who preferred size of the unit to be between 150 m^2 and 300 m^2 reached 25%, while the share for those who preferred size of the unit to be between 300 m^2 and 600 m^2 reached 15%.

4.2 Location of the Initial Development Phase

In coordination with PIEFZA, the IDP location that will yield a built-up area of about 10 donums is identified. Figure 14 shows the proposed IDP location. Photo 5 illustrates the proposed IDP location from a close location on Salem Road looking southwest. The proposed location has been chosen to be close between the middle and the northeastern part of NLIE site. This location is chosen based on a number of considerations, including:

- easy integration with the original Master Plan for NLIE proposed by Nablus Municipality,
- easy expropriation procedures which is particularly valid for the parcels within the portion of the NLIE under the jurisdictions of Nablus Municipality,
- closeness to the existing road network for easy and inexpensive access construction,
- proximity to the existing utilities and infrastructure services, and
- minimal site preparation and grading.

Based on all the above, the location for the IDP is selected to satisfy all the indicated considerations. The suggested location for the IDP is almost level, compatible with Nablus Municipality Master Plan for NLIE, partially lies within the portion of NLIE which is under the jurisdictions of Nablus Municipality, exists just off Salem Access Road, and is close to the existing utilities and infrastructure services.

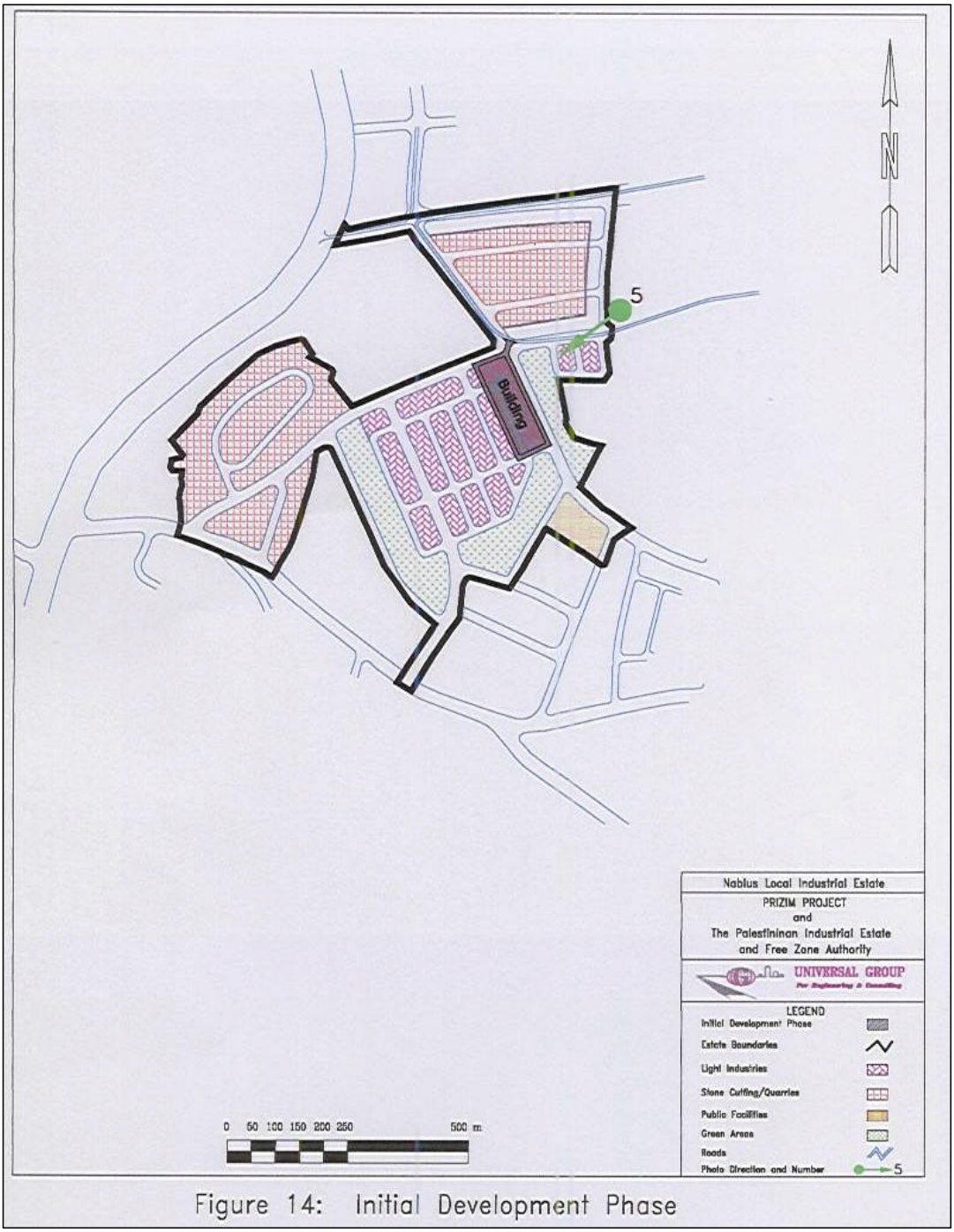

Figure 14: Initial Development Phase

Photo 5: Looking Southwest Toward the IDP Location from Salem Road

4.3 Development Formula

From the discussions with PIEFZA officials, it is concluded that preference is given to have maximum possible land use in order to have the whole project as much as possible financially viable. Yet, accommodating the necessary provisions for good functioning environment should not be over looked.

Zoning requirements for Industrial estates should be followed. It is required to conform to regulation No.5 for licensing of structures within the industrial areas issued by PIEFZA. This regulation restricts the percentage of under roof area to be 80% maximum. It also stipulates that the front setback should satisfy a minimum of 5m and that the side setback should satisfy a minimum of 2m.

Within the area for the Initial Development Phase, roofed area is fixed to equal 10,000 m^2. This built-up area is suggested to be 200m×50m. When excluding the space for services of %10, the net total area becomes:

$1000 \times 0.9 = 9000\ m^2$

The number of industrial units (X) is then calculated as follows:

$(0.60 \times 150 + 0.25 \times 300 + 0.15 \times 600)\ X = 9000\ m^2$
which results in X = 40 industrial units

Therefore, the distribution of the industrial units in terms of required size is calculated and presented in Table 6.

Table 6. The Distribution of Industrial Units for Each Size Category

Size category	Number of Units	Area (m^2)
150 m^2	0.60 × 40 = 24	24 × 100 = 2400
300 m^2	0.25 × 40 = 10	10 × 300 = 3000
600 m^2	0.15 × 40 = 6	6 × 600 = 3600
	40	**9000 m^2**

The 200m×50m built-up area is suggested to have the minimal setback requirements as presented above. In addition, sidewalks of 1.5 m are suggested and a two-lane loop road with a standard width of 7.2 m is proposed.

The lot identified for the IDP, as shown in Figure 14, yields a ratio of serviced land to raw land of 71.0% and the ratio of under roof to serviced area of 81.7%. These ratios are high and indicate good usage of the area.

4.4 Building Specifications

Considering the arrival at economically feasible buildings, while complying with the minimum technical requirements, it is recommended to use to the maximum possible extent locally manufactured materials complying with the Palestinian Standards.

The proposed built-up area is suggested to be constructed using Portland cement concrete with concrete bricks. The structural system is proposed to be the concrete slab-beam-column system.

Medium quality internal and external finishing is suggested (i.e., rendering and tyrolyne finishing using certain insulation materials).

Flooring is suggested to be made of local terrazo tiles. However, in places of heavy use, concrete floor can be used.

Fire protection and fighting provisions are to be considered. In addition, insulation and storm water collection and disposal systems are be used.

5 REQUIRED PHYSICAL IMPROVEMENT

5.1 Site Preparation

Minimum site grading and leveling is to be made for IDP. The site is almost level This is because the area is almost flat as stated in the site description. All vegetation in the site is to be cleared. The top soil is to be removed. No utilities exit or cross the proposed location for the IDP. In order to keep the site privacy and for

safety and security requirements, a fence is needed to be erected around the proposed IDP site.

5.2 Site Access

As described before, the site for the IDP has an easy access from Salem Local Road. A short connector road branching form Salem Road, which is no more than 40 m in length and has a standard curbed pavement width of 7.2 m, is to be constructed. As indicated before, Salem Road in connected to Suleiman Al-Nabulsi main road. However, Salem Road itself requires rehabilitation, as it has only a one lane road, which has pavement deterioration problems. The Length of Salem Road which needs rehabilitation to a high quality road with a standard pavement width of 7.2 m, is about 300 m from its intersection with Deir Al-Hatab Road towards the IDP location. This is illustrated in Figure 15.

5.3 Utility Connections

5.3.1 Water Supply

The estimated water demand for the NLIE is about 350m^3/day while the water demand of the IDP of about 10 dounms and 40 industrial units is about 80m^3/day. The proposed water supply system for NLIE consists of water storage facility in addition to distribution network. A ground storage tank 1000m^3 capacity is suggested for the NLIE, but of course not for the IDP.

As for the IDP, PVC storage tanks 1.5 to 2.5 m^3 capacity may be used for every individual industrial unit.

As mentioned before, three potential water supply sources are available:

1- The 8” water main from Marda well of Mekorot, which feeds the surrounding villages and Israeli settlement. On the long run, it is expected that the water demand of the villages will increase and full well capacity will be consumed to meet their increasing demand.

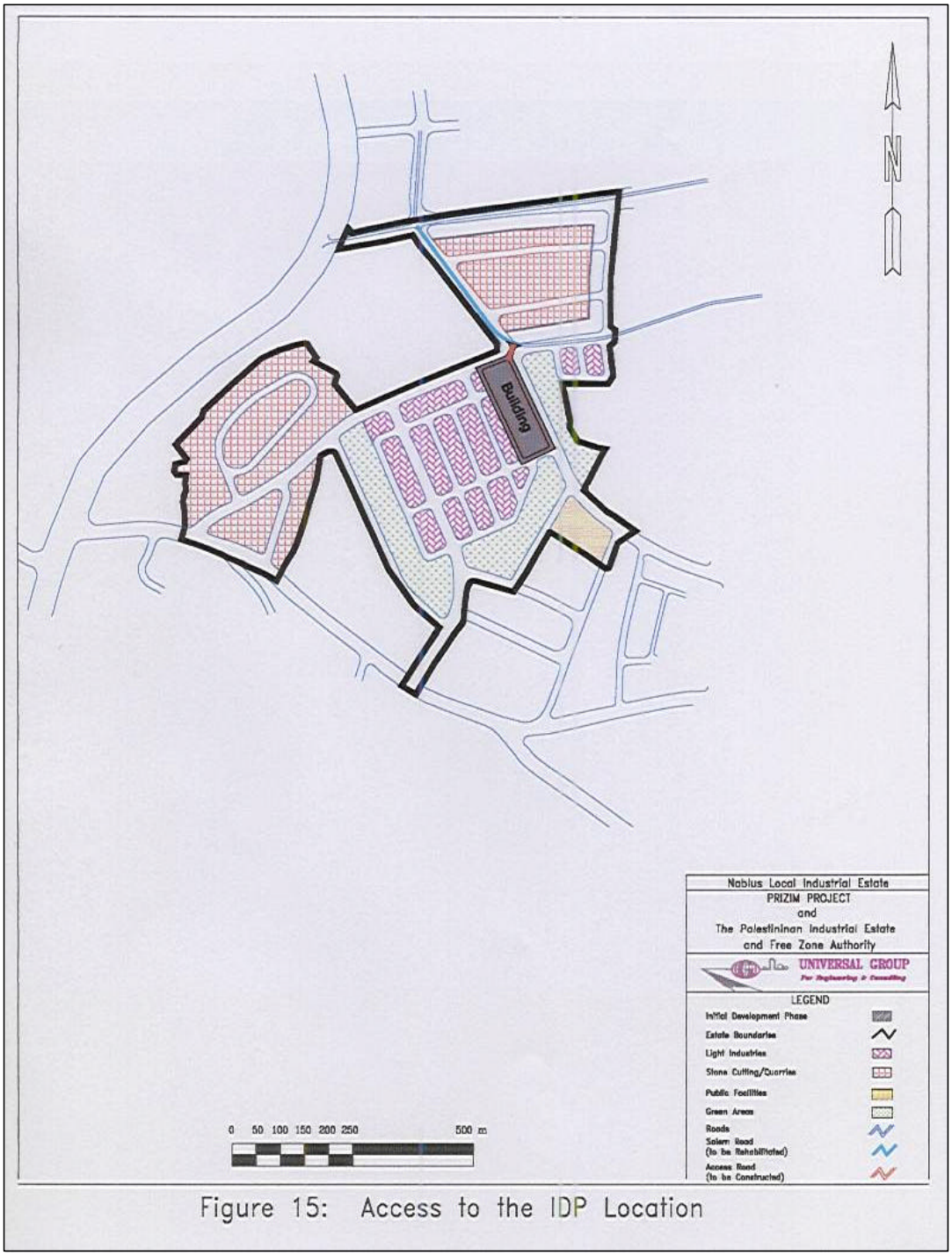

Figure 15: Access to the IDP Location

2- The 6" water main coming from Audala well and participate in feeding Nablus city.

3- On the long run the industrial estate can be considered to be supplied by the under planning well to be constructed by the Palestinian Water Authority in a location between the nearby Beit Dajan and Beit Furik. It seems that this water supply source will be the most suitable and reliable.

A 6" diameter UPVC pipe 500m long is needed to connect NLIE with the water main of Mekorot. Figure 16 shows the proposed layout of this water main.

5.3.2 Wastewater and Drainage Systems

The estimated wastewater production of NLIE is about 280m^3/day, while the estimated wastewater production for the IDP is about 64m^3/day. As mentioned before, the NLIE wastewater have to be either disposed into the wadi along with the municipal raw sewage presently flowing or a separate disposal and treatment system has to be constructed till the planned WWTP of Nablus- east is constructed.

As for IDP, if budget constraints allows to construct a disposal and treatment unit, it is preferred to construct it, otherwise the wastewater is to be directed to the wadi via an 8" diameter PVC pipe of 500m long.

On the other hand, the stormwater is supposed to be surface drained to some collection points and then drained to the wadi. It will dilute the flowing raw wastewater of Nablus-east and flow further down the valley.

The proposed 10" diameter pipe of 300m length will divert the stormwater to the wadi. The stormwater of the IDP will be surface drained to the proposed main sewer. Figure 17 shows both the sewage and stormwater mains to be constructed to serve the IDP.

5.3.3 Electrical Supply

The required electrical power demand of PLIE is supposed to be supplied through one of the nearby 33 kv medium voltage lines. From the two available sources of Nablus Municipality and the Israeli Electric Grid, it is suggested to connect with

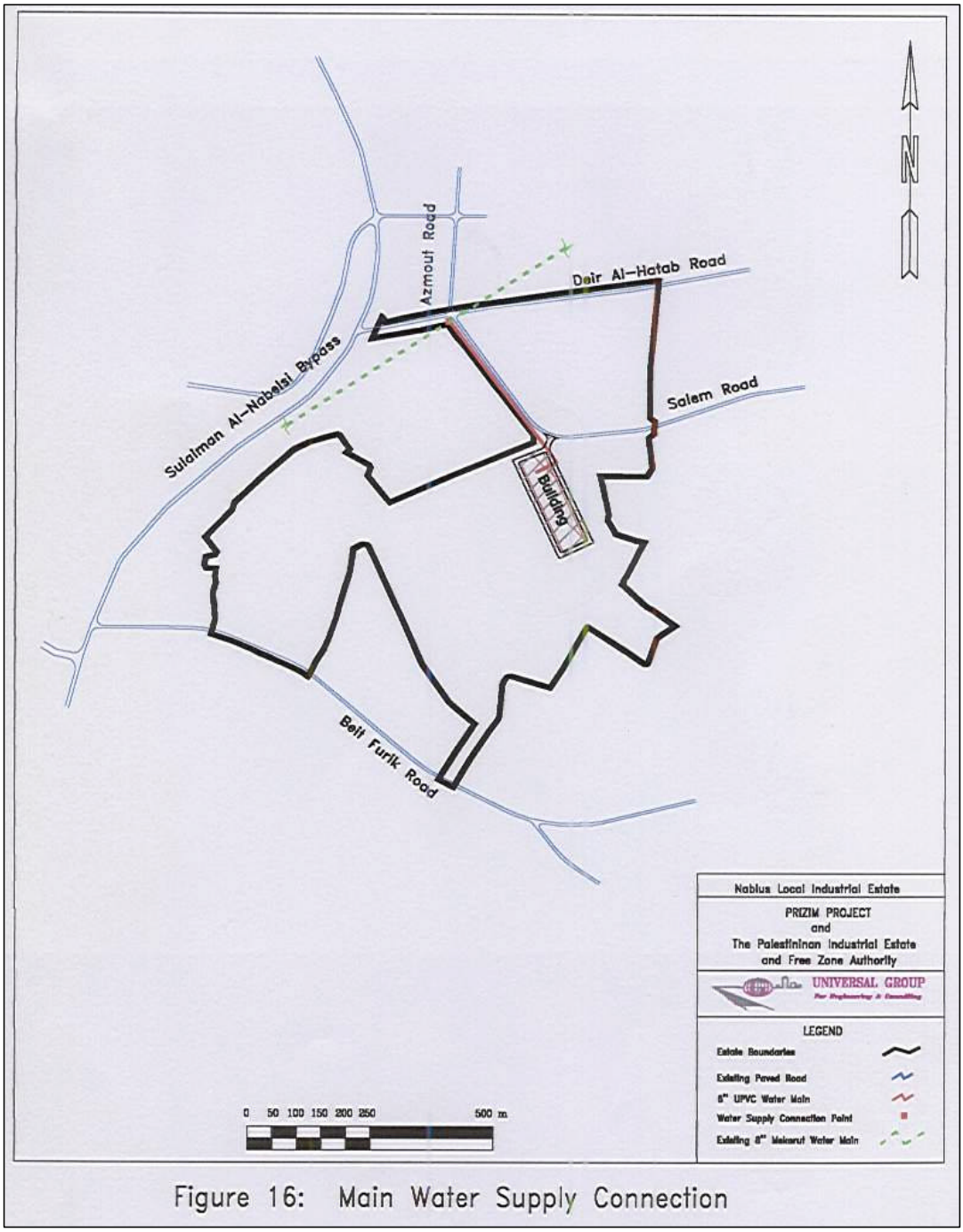

Figure 16: Main Water Supply Connection

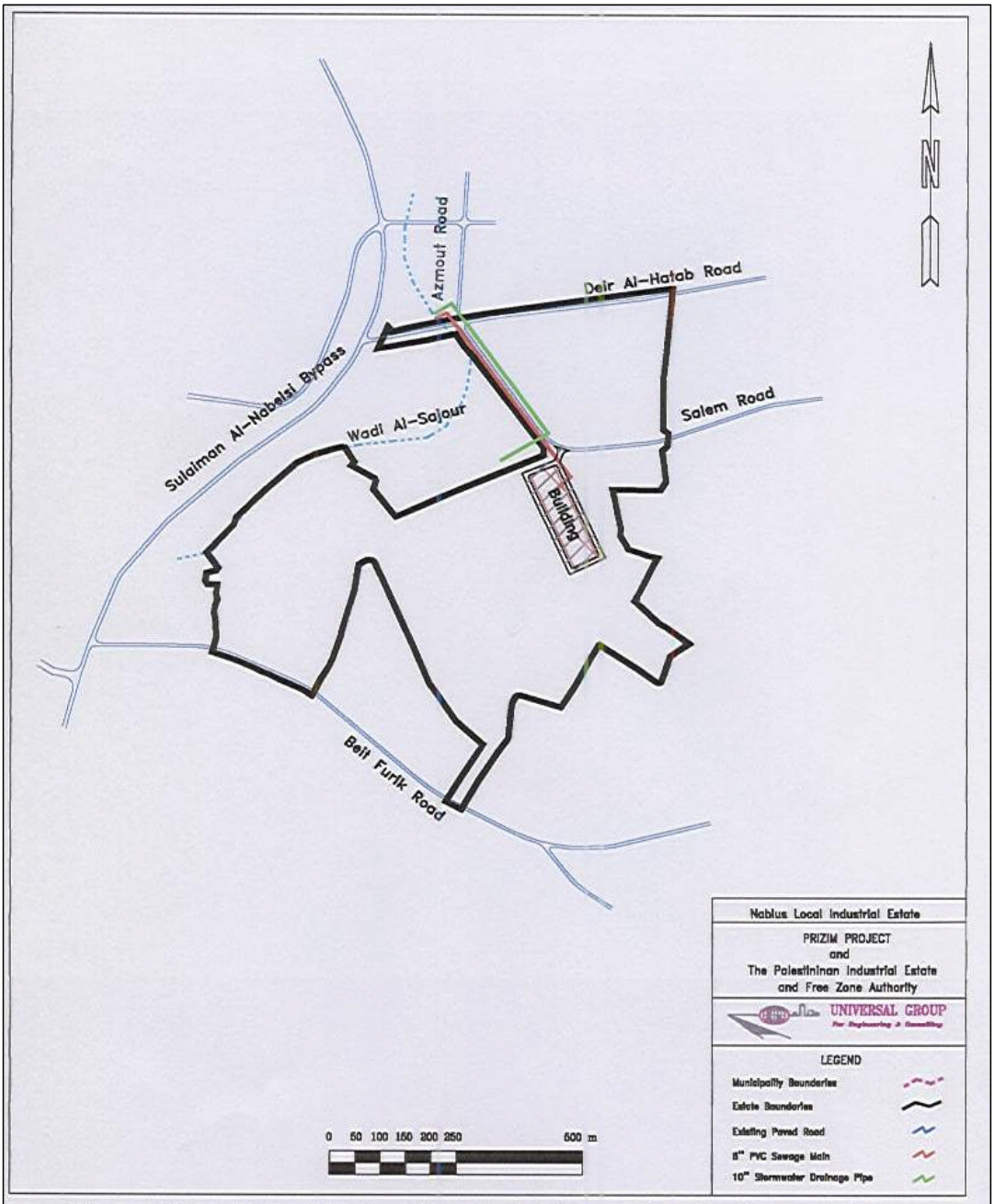

Figure 17: Main Wastewater and Stormwater Drainage Pipes

Nablus Municipality 33 kv line which ends close to the southwestern corner of NLIE. One sub-station is needed to supply the required electrical power. The transformer sub-station is suggested to be connected using underground cable system. Figure 18 illustrates the location of the proposed connection point and the suggested location of the underground electric power cable, which will run along one of the proposed roads within the NLIE as appear in the Master Plan for the estate prepared by Nablus Municipality. The length of the connection cable is estimated at 950 m. For the IDP, it is not recommended to have a standby electrical power source.

5.3.4 Telecommunications

As stated before, av4 telephone system passes through the proposed NLIE along Salem Road. PALTEL is willing to provide the NLIE with the required telephone lines. The capacity of the existing system is 8400 lines. A short v4 telephone cable connector of no more than 40 m is needed to connect the proposed IDP building with the existing system. Figure 19 illustrates the location of the proposed connection point and the suggested location of the underground cable that is proposed to serve the IDP site.

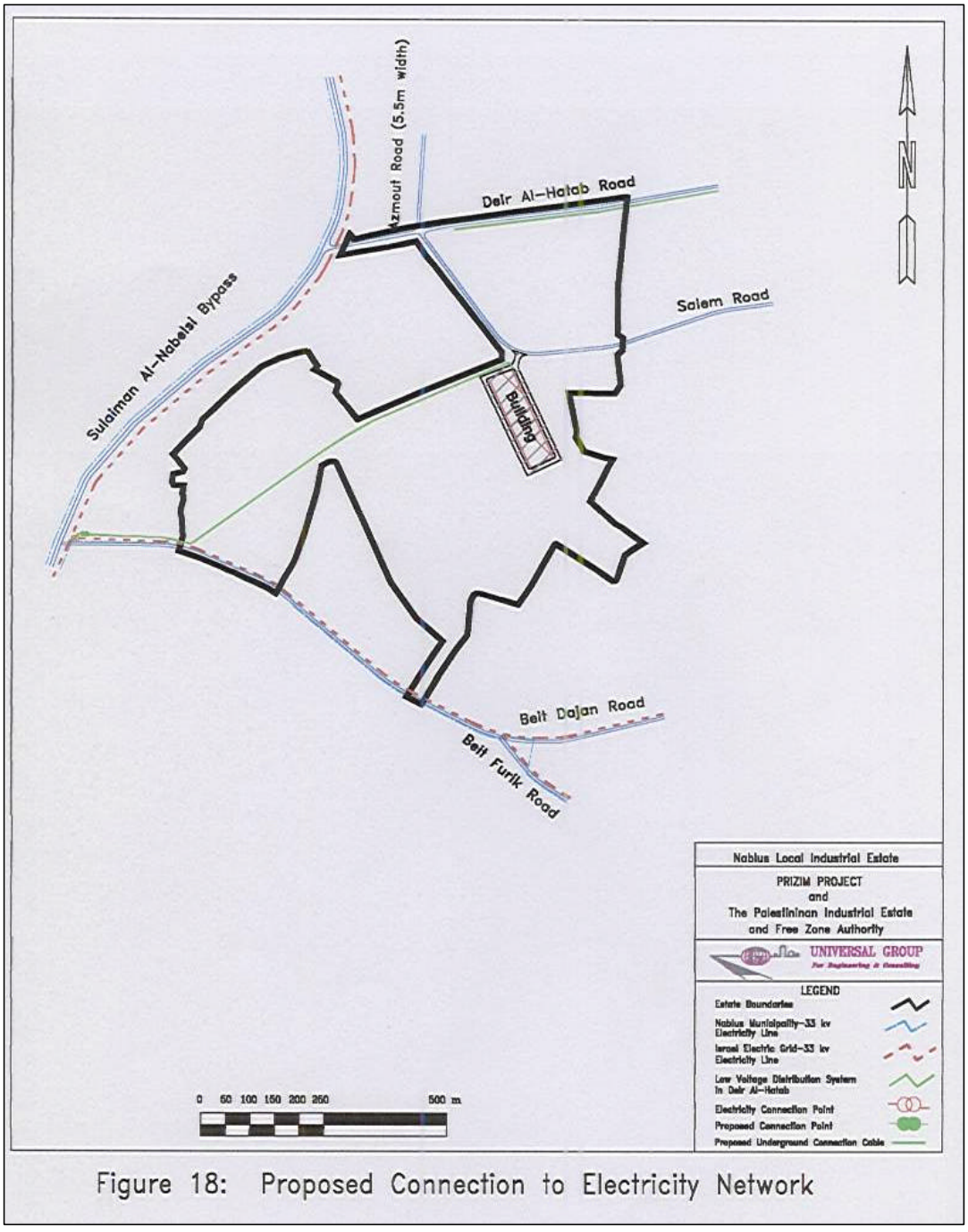

Figure 18: Proposed Connection to Electricity Network

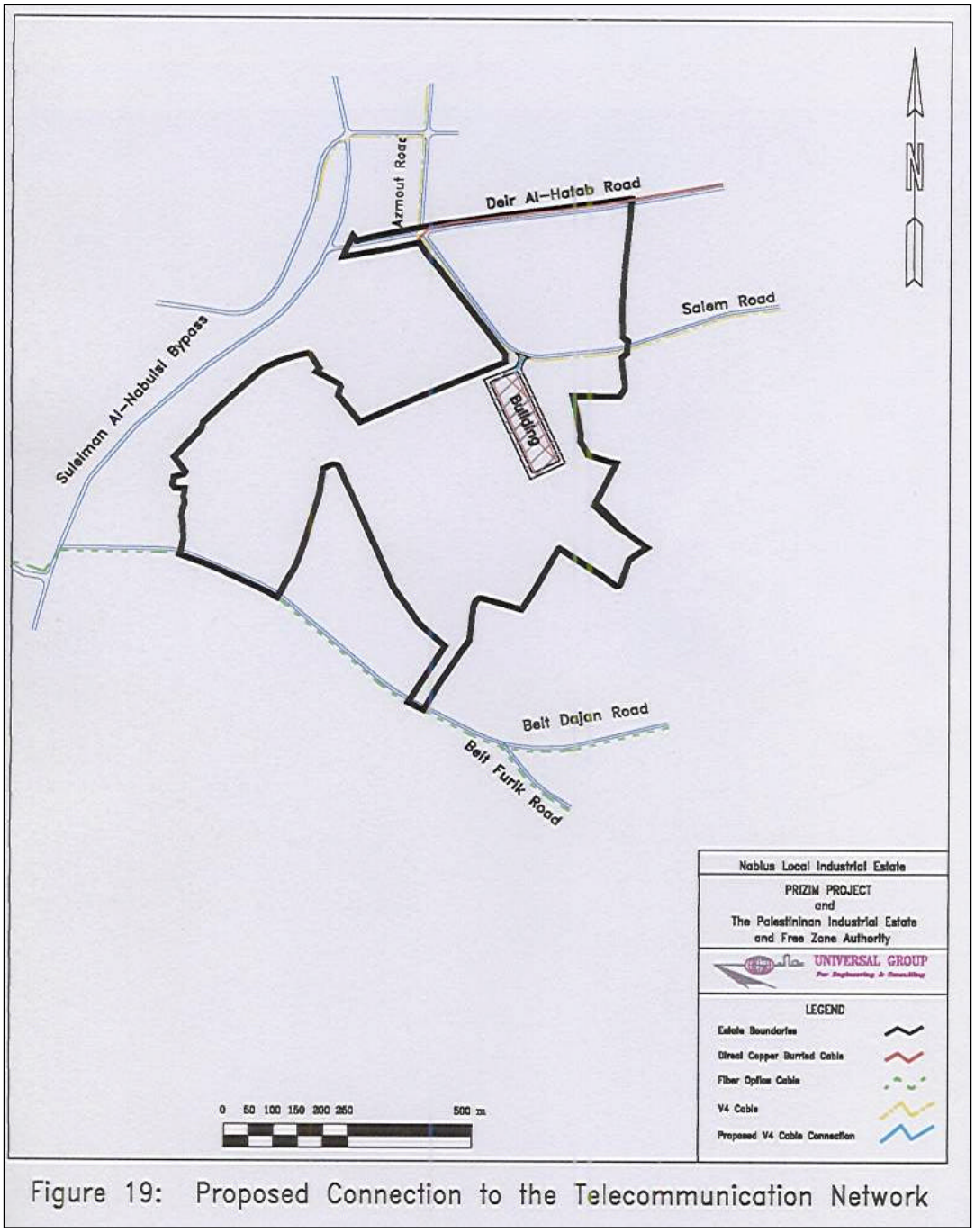

Figure 19: Proposed Connection to the Telecommunication Network

6 PROJECT DESCRIPTION SUMMARY

Project Description Summary is attached in Annex A.

7 COST ESTIMATION

This section describes the estimated cost of the construction of the IDP. It includes the cost estimates for the off-site as well as the on-site development infrastructure.

7.1 Cost Assumptions

The following are the assumptions considered in the estimation of the cost of the IDP:

- The cost estimates are prepared considering the use of proposed local construction materials.
- After calculating the capital investment cost (material plus labour costs), a mark up of 15% was added as contingencies.
- The fees are to be added as percentage of the total cost (including recurrent cost) as follows:
  - 3% for design and engineering
  - 10% for supervision and project management
- No customs or taxes were considered in the price calculations.
- The unit prices used accounted for all the required activities during the construction phase including: site preparation and handling and dumping of excavated materials.
- No compensation for land acquisition is considered in cost estimation.
- Building cost was not considered in the cost estimation.

7.2 Capital Investment

Capital investment was calculated to account for the following:

- Off-site infrastructure
- On-site infrastructure

Table 7 presents the components of the capital investment cost.

Table 7: The Components of the Capital Investment Cost

No.	Item Description	Cost(US$)
1	**Off-site Infrastructure**	
	Roads	36,150
	Water Works	137,000
	Electricity	159,000
	Telecommunications	1,500
	Sub-total	334,150
	Contingencies (15% of sub total)	50,123
	Sub-total Off-site	**384,273**
2	**On-site Infrastructure**	
	Site Preparation	69,900
	Roads	317,533
	Water Works	108,400
	Electricity	64,000
	Telecommunications	21,000
	Sub-total	580,833
	Contingencies (15% of sub total)	87,125
	Sub-total On-site	**667,958**
	GRAND TOTAL	**1,052,231**

7.3 Recurrent Costs

The recurrent costs are calculated based on current local practices. These percentages were calculated as 4% percent of the capital investment cost. Table 8 presents the recurrent cost of the various components as mentioned above.

7.4 Cost Estimate Spreadsheet

Cost Estimate Spreadsheet is attached in Annex B.

Table 8: Recurrent Cost

No.	Item Description	Recurrent Cost (US$)
1	**Off-site Infrastructure**	
	Roads	1,446
	Water Works	5,500
	Electricity	6,360
	Telecommunications	60
	Contingencies	2,004
	Sub-total Off-site	**15,370**
2	**On-site Infrastructure**	
	Site Preparation	2,796
	Roads	12,701
	Water Works	4,336
	Electricity	2,560
	Telecommunications	840
	Contingencies	3,485
	Sub-total On-site	**26,718**
	GRAND TOTAL	**42,088**

Annex A : Project Summary Template

Annex A: Project Summary Template

Category	Site Attribute
EXISTING SITE	
Physical site	▪ NLIE is located on the eastern boundaries of Nablus Municipality. ▪ It extends parallel to Suleiman Al-Nabulsi Bypass. ▪ NLIE is located to the east of Nablus Industrial Area. ▪ It is located just to the west of the two newly planned light industrial estates: one privately owned, and the other owned by An-Najah National University/Nablus Municipality.
Size	▪ 44.4 hectares
Relative location (km)	▪ Nablus Municipality boundary 0.00 ▪ Nablus Industrial Zone 1.50 ▪ Nablus Industrial Estate near Zatara 14.00 ▪ Nablus Central Business District (CBD) 5.40 ▪ Howara Junction 4.50 ▪ Al-Masaken Junction 2.30 ▪ Private Light Industrial Estate 0.25 ▪ An-Najah National University/Nablus Municipality Light Industrial Estate 0.05
Ownership and area (donums)	A partial list of land ownership especially located near or within the IDP is presented below (all in Block 13, Azmout): ▪ Mefleh Hasaan and Co. (0.5) ▪ Ibraheem Shehada and Co. (0.7) ▪ Abed Al-Fatah Alawnehand Co. (1.8) ▪ Rateb Yaseen and Co. (0.8) ▪ Atef Al-O't and Co. (1.9) ▪ Mohammed Al-O't and Co. (2.0) ▪ Mohammed Al-O't (3.0) ▪ Shareef Saleh (0.5) ▪ Adel Rasheed and Co. (0.7) ▪ Abedallah Saleh and Co. (0.9) ▪ Ibraheem Thabet and Co. (1.4) ▪ Nablus Municipality (2.1) ▪ Tha'er Afana and Co. (1.3) ▪ Nablus Municipality (1.3) ▪ Zakeyeh Basuoni (1.4) ▪ Kamel Saleh and Co. (0.8) ▪ Ibraheem Hasan and Co. (1.8) ▪ Kamal Saleh and Co. (3.3) ▪ Ragheb Saleh and Co. (2.0) ▪ Tawfeek Hamed and Co. (6.6) ▪ Salah Al-Akleek and Co. (0.7) ▪ Kamal Saleh and Co. (0.6) ▪ Hasan Rasheed and Co. (4.3) ▪ Abduallah Saleh and Co. (2.5) ▪ Ibraheem Saleh and Co. (1.3) ▪ Salah Abu Salha and Co. (4.4)

Existing structures	▪ There is one built structure and two others under construction in the northern part of the site ▪ there are 5 structures in the southwest corner of the site.
Grade and drainage	▪ Almost flat area except a hill located on the southwestern part of the site. ▪ Sajour valley exists close to the western border of the estate running in a northern direction.
Soil conditions	▪ Top Terra Rosa of 0.6-1.0 thick clay soil red-brownish in colour. ▪ The second layer is limestone fractured rocks.
Water table	▪ Average below the ground surface. 200m ▪ Potable, low nitrate and chloride contents.
Road access	▪ The southwestern corner of the site is adjacent to Beit Furik Road. In addition, a separate access is provided from Beit Furik Road. ▪ Deir Al-Hatab Road forms the northern boundary of NLIE. ▪ Salem Road passes through the northeastern corner of the site. ▪ Access from Deir Al-Hatab and Beit Furik roads is provided through Suleiman Al-Nabulsi Bypass.
Water supply	▪ Source 1: Mekorot Line. - Distance: 500m north of the IDP site. - Capacity: Sufficient - Available and reliable for the short run. ▪ Source2: Audala well Line (6") - Distance: 1500m south of NLIE - Capacity: 350m^3/hr. - Available and reliable for the short run. ▪ Source 3: Proposed new well to be drilled in Beit Furik/Beit Dajan area. - Distance: 400m-600m east of NLIE. - Capacity: Not known. - Expected to be available and reliable for long run.
Wastewater	▪ No available wastewater collection system. ▪ WWTP of Nablusi-east is planned to be constructed about 100m northwest of site.
Electricity	▪ Source 1: Nablus Municipality, where they have a 33kv medium voltage line to the west of Suleiman Al-Nabulsi Bypass and another similar line, which ends at the corner of Beir Furik–Suleiman Al-Nabulsi Roads. Reliable source. ▪ Source 2: The Israeli Electrical Grid, which serves Beit Furik, Beit Dajan, Deir Al-Hatab, and Salem through 33kv medium voltage lines, which branch from main line along the eastern side of Suleiman Al-Nabulsi Street. Reliable source.
Telecommunications	▪ Source 1: v4 duct system with capacity of 8,400 lines passing through the project site along Salem Road. Reliable source. ▪ Source2: Fiber Optics line with capacity of 10,000 lines expandable 100,000 lines adjacent to the southern side of the estate along Beit Furik Road. Reliable source. ▪ Reliable for short and long run.

Initial development	▪ In the northeastern part of NLIE located between middle and northeastern corner of NLIE. Total area for development is 17.25 donums. ▪ Built up area of 10 donums.
DEVELOPMENT	
Gross/net land yield	▪ 71.0%
Floor area ratio	▪ 81.7%
Under roof area	▪ 10 dorums
Average unit	▪ 225 m^2
Number of units	▪ 40
IMPROVEMENTS	
Site preparation	▪ Limited grading works. ▪ All vegetation in the site is to be cleared. ▪ The top soil is to be removed.
Road access	▪ A short connector road branching from Salem Road, which is no more than 40 m in length and has a standard curbed pavement width of 7.2 m, is to be constructed. ▪ Salem Road requires rehabilitation. The length of Salem Road which needs rehabilitation to a high quality road with a standard pavement width of 7.2 m, is about 300 m from its intersection with Deir Al-Hatab Road towards the IDP location.
Water supply	▪ 500m, 6” UPVC water pipe connected to Mekorot main line.
Wastewater	▪ Wastewater is to be drained in the wadi mixing with Nablus Municipal waste. ▪ Onsite disposal and treatment units are proposed to be temporally implemented of based on types of industries. ▪ 500m, 8” UPVC wastewater pipe to drain into wadi. ▪ Onsite disposal and treatments based on types of industries are proposed to be temporarlly implemented.
Electricity	▪ Connection is recommended with Nablus Municipality 33 kv line, which ends close to the southwestern corner of NLIE. ▪ One sub-station is suggested to supply the required electrical power. Connection to the IDP is suggested to be connected using underground cable system. ▪ The length of the connection cable is estimated at 950 m.
Telecommunications	▪ A short v4 telephone cable connector of no more than 50 m in length is needed to connect the proposed IDP building with the existing system.
Facilities	▪ Common facilities will be part of the building (built up area).
Security	▪ Fencing and security gate.
Others	-

Annex B: Cost Estimate Spreadsheet

OFF-SITE INFRASTRUCTURE: ENGINEERING COSTS
COST ESTIMATE BREAKDOWN FOR NABLUS LIE

LINE ITEMS	*DESCRIPTION*	*DAY*	*QUANTITY*	*UNITS*	*UNIT RATE*	*TOTALS*
1	**ROADS**	***TOTAL***				
1.1	UNCLASSIFIED EXCAVATION		100	CU.M	$4.50	$450
1.2	SUB-BASE COURSE		3500	SQ.M	$1.50	$5,250
1.3	CRUSHED AGGREGATE BASE COURSE		3500	SQ.M	$3.00	$10,500
1.4	BITUMINOUS PRIME COAT		2500	SQ.M	$0.38	$938
1.5	HOT BITUMINOUS CONCRETE WEARING COURSE (5cm)		2500	SQ.M	$3.75	$9,375
1.6	PAINTED PAVEMENT LINES		200	SQ.M	$3.00	$600
SUBTOTAL 1						**$27,113**
LABOUR		**452**				**$9,038**
CONTINGENCY						**$5,423**
LINE ITEMS	***DESCRIPTION***	***DAY***	***QUANTITY***	***UNITS***	***UNIT RATE***	***TOTALS***
2	**WATER WORKS**	***TOTAL***				
2.1	**SEWERAGE PIPES**					
	8 inch DIA PIPE					
	A. EXCAVATION		500	L.M	$16.00	$8,000
	B. PIPE LAYING, BEDDING AND BACKFILLING		500	L.M	$32.00	$16,000
	C. MANHOLES		10	L.M	$360.00	$3,600
	D. REINSTATEMENT		500	L.M	$12.80	$6,400
2.2	**STORMWATER PIPES**					
	12 inch DIA PIPE					
	A. EXCAVATION		350	L.M	$16.00	$5,600
	B. PIPE LAYING, BEDDING AND BACKFILLING		350	L.M	$44.00	$15,400
	C. MANHOLES AND CATCHBASIN		7	L.M	$360.00	$2,520
	D. REINSTATEMENT		350	L.M	$12.80	$4,480
2.3	**WATER PIPES**					
	6 inch DIA WATER PIPE					
	A. EXCAVATION		500	L.M	$14.40	$7,200
	B. PIPE INSTALLTION, FITTINGS, BEDDING AND BACKFILLING		500	L.M	$64.00	$32,000
	C. VALVES AND VALVE CHAMPERS		4	L.M	$600.00	$2,400
	D. REINSTATEMENT		500	L.M	$12.80	$6,400
SUBTOTAL 2						**$110,000**
LABOUR		**1375**				**$27,500**
CONTINGENCY						**$20,625**

LINE ITEMS	***DESCRIPTION***	***DAY***	***QUANTITY***	***UNITS***	***UNIT RATE***	***TOTALS***
3	**ELECTRICAL**	***TOTAL***				
3.1	360KVA TRANSFORMER STATION INCLUDES SWITCHGEAR		1	NO.	$85000.00	$85,000
	AND SUBSCRIPTION FEES					
3.2	MEDIUM VOLTAGE UNDERGROUND CABLE		950	L.M.	$51.00	$48,450
3.3	ROAD LIGHTING POLE		4	UNIT	$425.00	$1,700
SUBTOTAL 3						**$135,150**
LABOUR		**1193**				**$23,850**
CONTINGENCY						**$23,850**
LINE ITEMS	***DESCRIPTION***	***DAY***	***QUANTITY***	***UNITS***	***UNIT RATE***	***TOTALS***
4	**TELECOMMUNICATIONS**	***TOTAL***				
4.1	DUCT BANK SYSTEM: 4 X 100MM DUCT BANK COMPLETE		50	L.M	$25.50	$1,275
	INSTALLED W/MANHOLES					
SUBTOTAL 4						**$1,275**
LABOUR		**11**				**$225**
CONTINGENCY						**$225**
GRAND TOTAL		**3031**				**$384,273**

ON-SITE INFRASTRUCTURE: ENGINEERING COSTS

COST ESTIMATE BREAKDOWN FOR NABLUS LIE

LINE ITEMS	*DESCRIPTION*	*DAY*	*QUANTITY*	*UNITS*	*UNIT RATE*	*TOTALS*
1	**SITE PREPARATION**	***TOTAL***				
1.1	GRADING AND LEVELING			LS		$31,500
1.2	FENCING			LS		$17,430
SUBTOTAL 1						**$48,930**
LABOUR		**1049**				**$20,970**
CONTINGENCY						**$10,485**
LINE ITEMS	***DESCRIPTION***	***DAY***	***QUANTITY***	***UNITS***	***UNIT RATE***	***TOTALS***
2	**ROADS**	***TOTAL***				
2.1	UNCLASSIFIED EXCAVATION		4500	CU.M	$4.50	$20,250
2.2	SUB-BASE COURSE		13800	SQ.M	$1.50	$20,700
2.3	CRUSHED AGGREGATE BASE COURSE		13800	SQ.M	$3.00	$41,400
2.4	BITUMINOUS PRIME COAT		13800	SQ.M	$0.38	$5,175
2.5	HOT BITUMINOUS CONCRETE WEARING COURSE (5cm)		13800	SQ.M	$3.75	$51,750
2.6	PARKING AREA (CONCRETE TILES)		4000	SQ.M	$10.00	$40,000
2.7	CONCRETE TILES FOR SIDEWALK		4100	SQ.M	$9.75	$39,975
2.8	CURB STONE		2100	L.M	$9.00	$18,900
SUBTOTAL 2						**$238,150**
LABOUR		**3969**				**$79,383**
CONTINGENCY						**$47,630**
LINE ITEMS	***DESCRIPTION***	***DAY***	***QUANTITY***	***UNITS***	***UNIT RATE***	***TOTALS***
3	**WATER WORKS**	***TOTAL***				
3.1	**SEWERAGE SYSTEM**					
	SUPPLYING AND INSTALLING 6" UPVC PIPES FOR FUTURE UNIT CONNECTIONS UP TO 10 M FROM THE MANHOLE. PRICE INCLUDES EXCAVATION, NECESSARY BEDDING, BACKFILLING, PLUG, AND REINSTATEMENT.		120	CONNECTION	$320.00	$38,400

ON-SITE INFRASTRUCTURE: ENGINEERING COSTS
COST ESTIMATE BREAKDOWN FOR NABLUS LIE

3.2	**STORMWATER SYSTEM**					
	SUPPLYING AND INSTALLING 6" UPVC PIPES FOR FUTURE STREET CONNECTIONS UP TO 10 M FROM THE CATCHBASIN (TOTAL 50M). PRICE INCLUDES EXCAVATION, NECESSARY BEDDING, BACKFILLING, CATCHBASIN, AND REINSTATEMENT.		12	CONNECTION	$560.00	$6,720
3.3	**WATER SYSTEM**					
	SUPPLYING AND INSTALLING 2" PE PIPES FOR UNIT CONNECTIONS UP TO 10 M FROM THE VALVE. PRICE INCLUDES, PIPES, FITTINGS, EXCAVATION, NECESSARY BEDDING, BACKFILLING, VALVES, AND REINSTATEMENT.		120	CONNECTION	$240.00	$28,800
3.4	**FIRE HYDRANT**					
	DIAMETER 2 inch		8	NO.	$1600.00	$12,800
SUBTOTAL 3						**$86,720**
LABOUR		**1084**				**$21,680**
CONTINGENCY						**$16,260**
LINE ITEMS	***DESCRIPTION***	***DAY***	***QUANTITY***	***UNITS***	***UNIT RATE***	***TOTALS***
4	**ELECTRICAL**	***TOTAL***				
4.1	LOW VOLTAGE ELECTRICAL CABLE		700	L.M.	$25.50	$17,850
4.2	SUB-DISTRIBUTION BOARD		12	L.M.	$850.00	$10,200
4.3	ROAD LIGHTING POLE		62	NO.	$425.00	$26,350
SUBTOTAL 4						**$54,400**
LABOUR		**480**				**$9,600**
CONTINGENCY						**$9,600**
LINE ITEMS	***DESCRIPTION***	***DAY***	***QUANTITY***	***UNITS***	***UNIT RATE***	***TOTALS***
5	**TELECOMMUNICATIONS**	***TOTAL***				
5.1	DUCT BANK SYSTEM: 4 X 100MM DUCT BANK COMPLETE		700	L.M	$25.50	$17,850
	INSTALLED W/MANHOLES					
SUBTOTAL 5						**$17,850**
LABOUR		**158**				**$3,150**
CONTINGENCY						**$3,150**

ON-SITE INFRASTRUCTURE: ENGINEERING COSTS
COST ESTIMATE BREAKDOWN FOR NABLUS LIE

GRAND TOTAL	**6739**			**$667,958**

SUMMARY OF CAPITAL BUDGET COSTS: ENGINEERING COSTS

OFF-SITE COST ESTIMATES FOR NABLUS LIE

INFRASTRUCTURE	CAPITAL BUDGET COSTS	TOTAL PRICE WITHOUT CUSTOMS OR VAT
Roads	**$36,150**	**$37,596**
Water Works	**$137,500**	**$143,000**
Electricity	**$159,000**	**$165,360**
Telecommunications	**$1,500**	**$1,560**
SUBTOTAL 1	**$334,150**	**$347,516**
CONTINGENCIES 15%	**$50,123**	**$52,127**
FEES		
Design and Engineering		**$11,989**
Supervision/Project Management		**$39,964**
Other		
SUBTOTAL 2		**$51,954**
FINAL TOTAL		**$451,597**

SUMMARY OF CAPITAL BUDGET COSTS: ENGINEERING COSTS

ON-SITE COST ESTIMATES FOR NABLUS LIE

INFRASTRUCTURE	CAPITAL BUDGET COSTS	TOTAL PRICE WITHOUT CUSTOMS OR VAT
Site Preparation	**$69,900**	**$72,696**
Roads	**$317,533**	**$330,234**
Water Works	**$108,400**	**$112,736**
Electricity	**$64,000**	**$66,560**
Telecommunications	**$21,000**	**$21,840**
SUBTOTAL 1	**$580,833**	**$604,066**
CONTINGENCIES 15%	**$87,125**	**$90,610**
FEES		
Design and Engineering		**$20,840**
Supervision/Project Management		**$69,468**
Other		
SUBTOTAL 2		**$90,308**
FINAL TOTAL		**$784,984**